Urban Passenger Transport in Developing Countries

Socio-economic impact and the choice of technology

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- Socio-economic impact and the choice of technology

by

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NO. 15 1985

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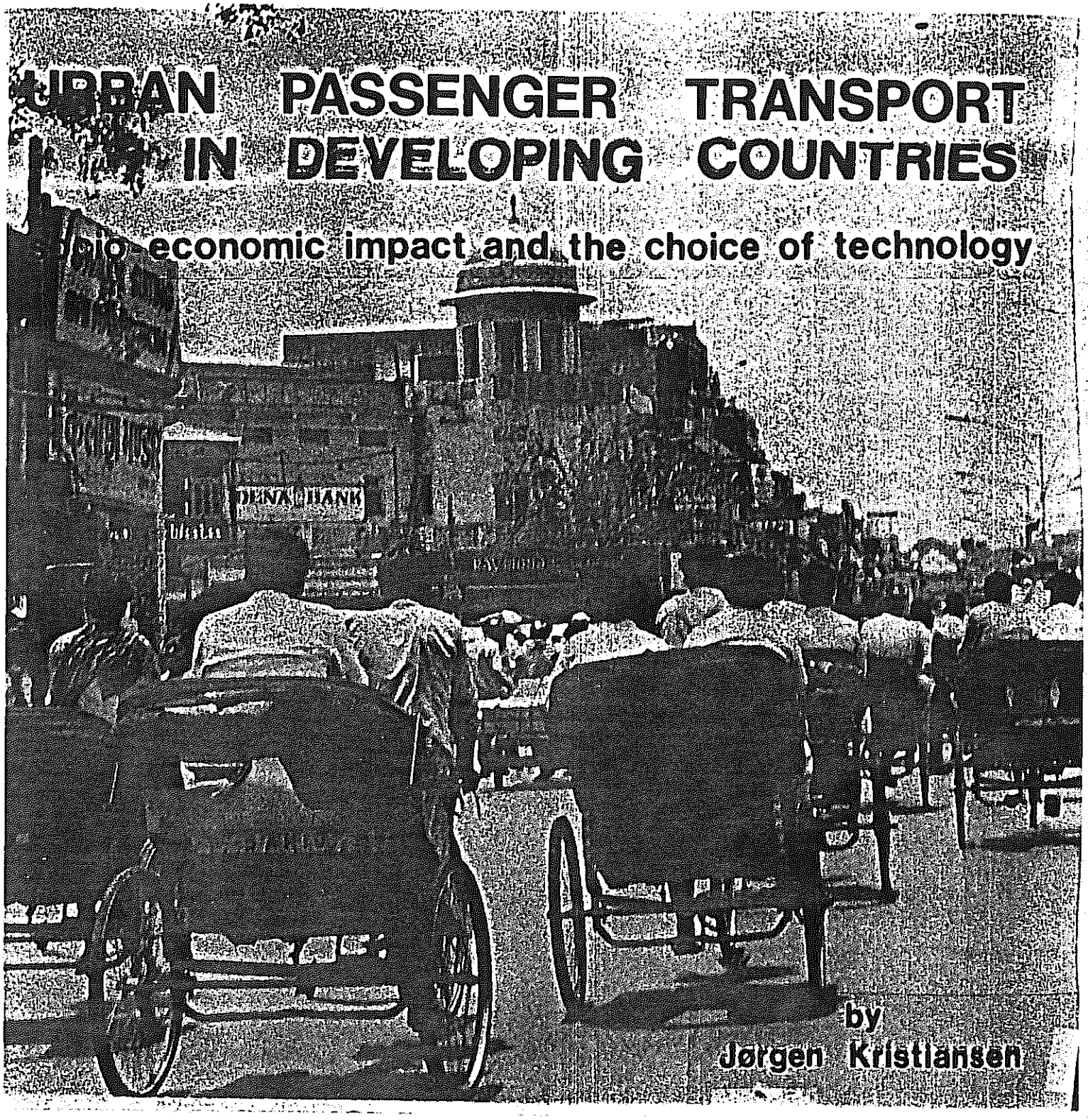

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PREFACE

The aim of this paper is to discuss the choice of technology within the urban transport sector in developing countries - with particular reference to passenger transport and its influence on socio-economic development.

The paper is based on two presumptions.
Firstly, the aid agencies and the national governments have to be more aware of the urban sector as a potential area of the future development policy. And urban passenger transport is recognized as a strategic factor within this sector as it influences the social and economic mobility.
Secondly, technological solutions to the urban transport problems should be based on the capabilities of present productive forces in order to promote large scale improvements and significant development effects.
Besides, not only political, economic and social conditions affect the choice of technology, but also the environmental impact and cultural traditions should be considered.

The 1st chapter deals with the general role of transport in the physical and socio-economic urban development.
The 2nd chapter describes the more specific characteristics of transport and traffic in the urban areas of developing economies.
The 3rd chapter discusses the present strategies and policies on urban passenger transport, and tries to formulate some tentative guidelines for identification of urban development projects within the transport sector.

Aalborg University
January 1985
Jørgen Kristiansen

CONTENTS

CHAPTER 1

TRANSPORT AND URBAN DEVELOPMENT

INTRODUCTION.

The chapter describes the role of transport as a stimulator of or a bottleneck for socio-economic development. And it identifies some general development trends in the urbanization process which increases the need for transport infrastructure.

THE URBAN POPULATION GROWTH.

General development trends.

In developing countries the urban population is growing extremely fast.
The total urban population of Africa was about 100 million people in 1980. According to a UN-forecast the urban population will increase to about 300 million by year 2000.
For India it has been estimated that the urban population by year 2000 will reach about 280 million, i.e. three times the urban population level at year 1970. However, these figures do not reflect the tremendously high growth rates of the larger towns and cities. The cities attract population not only from the rural areas but also from smaller towns.
Several larger towns and cities in Africa and Asia have annual average population growth rates of about 10 per cent, i.e. a doubling time of 7 years.
For example, in 1980 Dar es Salaam in Tanzania and Nairobi in Kenya both had a population about 1.0 million people, and were growing by approximately 100.000 people

Living conditions and birth control.

Except from the outbreak of heavy famine and epidemics - only a deliberate change of the socio-economic conditions combined with effectively implemented birth control schemes will be able to change these trends of population growth.

As far as the socio-economic conditions are concerned the rural-urban migration imposes drastical changes in living conditions on the people moving to the urban areas, and this might in the long run reduce the birth rates. However, still the rural population will be able to contribute to a high overall growth rate.

And only a small part of the increasing urban population is confronted with living conditions favourable enough to change their attitudes concerning birth control.

Furthermore, the question of birth control is still a political taboo in the public debate in many developing countries. Efforts to reduce the population growth are totally neglected in the practical policy of several countries. Even for those countries where a birth control policy may be implemented in the near future, it takes several years before significant effects from such a policy would materialize.

THE URBAN AND RURAL SECTOR.

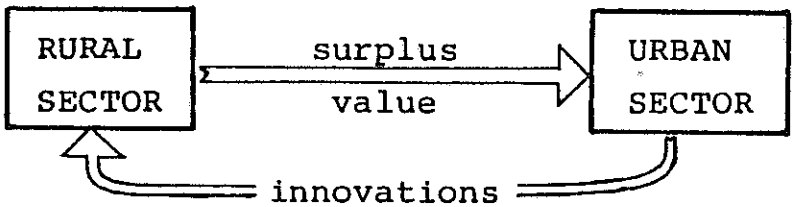
In contrast to rural areas the urban areas physically appear as a concentration of socio-economic activities, and hence with a concentration of physical infrastructure and buildings.

The urban area is characterized by a high population density, and an increasing degree of labour division.

The urban machinery consumes in order to operate and expand.

In the initial phases of urbanization the rural sector has to provide the surplus value in order to finance the investments in infrastructure and means of production, the increasing operation costs, the expanding urban bureaucracy, and to feed the growing urban population.
The transfer of surplus value from the rural to the urban sector might take place by direct domestic transfer of resources from the rural sector, and by an increasing export of goods from the rural sector. Both means require an increasing rural productivity.
Several developing countries are still characterized by this relationship between the rural and the urban sector.

In later phases the urban sector might provide some of the surplus value for its own consumption and expansion (except for basic food stuff). The cities might even develop innovations to be transferred back to the rural sector in order to stimulate the rural productivity:



THE SOCIO-ECONOMIC ROLE OF URBAN TRANSPORT.

Basic concepts.

Transport is the physical movement of people or goods from one location to another.
Transport generates traffic, i.e. the flow or movement of the means of transport, for example cars, buses, lorries, rickshaws, bicycles, headbaskets etc.
The general purpose of transport is to reduce the importance of differences in geographical location, i.e. distance is a key-concept in the transport process. Distance is a measure of resistance against the overcoming

of differences in location, and it might be expressed either in units of length, cost or time, or as a combination of these three units.

Transport as a pre-requisite for economic development.

Roughly the economic activities of urban areas can be divided into a production sphere, a circulation sphere, and a reproduction sphere.
The production sphere includes acitivties related to the production of goods and services (commodities) in a wide economic sense.
The circulation sphere includes activities to provide the exchange of commodities between demanders (buyers) and suppliers (sellers) at the market.
The reproduction sphere includes activities of providing residence, consumption, education, health, recreation and other social services.

As the transport system of a town or an urban area is of basic importance for every physical movement of both people and commodities, transport enters as a pre-requisite for the circuit flow of capital, and for the provision of social services.

As a pre-requisite within the production sphere transport is necessary in order to combine the factors of production (i.e. labour, means of production) in the production process.
Included in this category is external transport of labour, raw materials, intermediate goods, and energy sources.

As a pre-requisite within the circulation sphere transport establishes the physical connection to the market and thus enables the exchange to take place by confronting the produced commodities and the demanders.

As a pre-requisite within the reproduction sphere transport enables the people to attend the social activities and to make use of the social services.

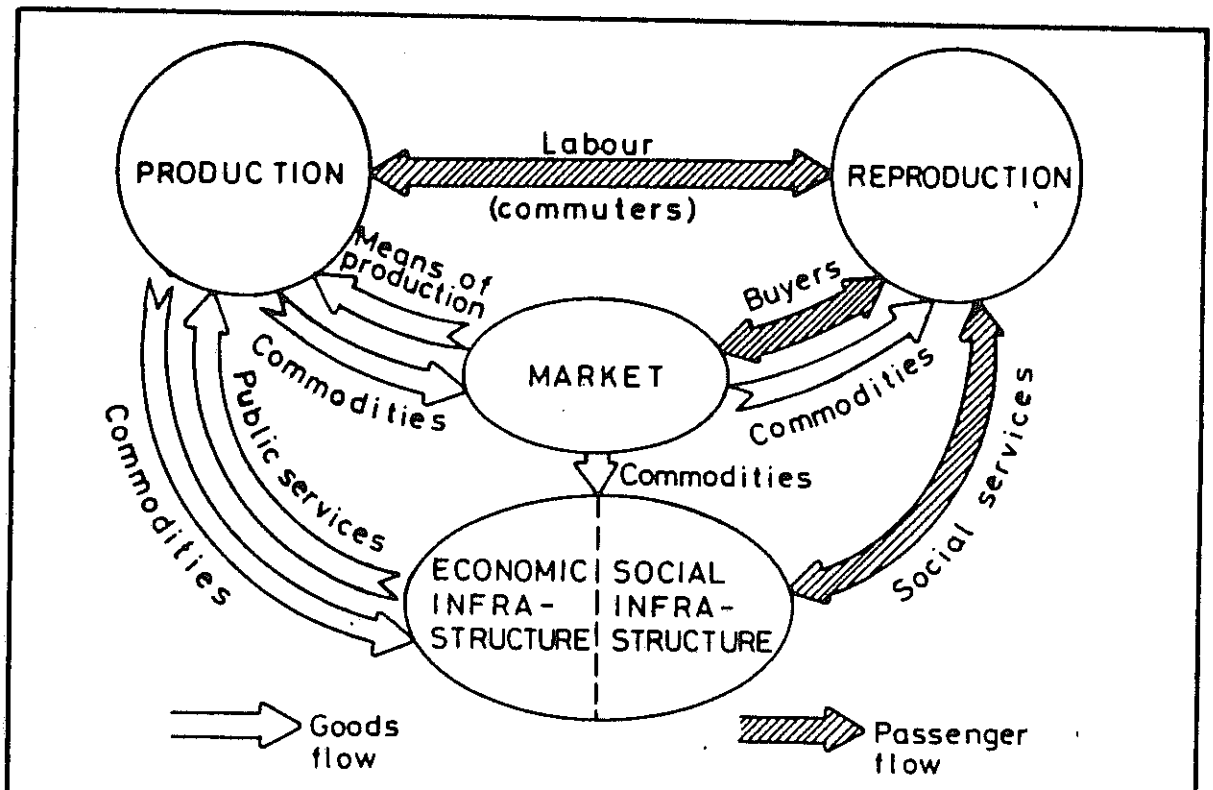


FIG. 1.1: TRANSPORT MOVEMENTS IN THE URBAN ECONOMY

Transport as a stimulator of economic growth.

As a stimulator of economic growth an efficient transport system:

(i) reduces the marginal transport costs that the enterprises have to pay directly for transport of goods, and indirectly for transport of labour (e.g. the individual company does not pay the cost of upgrading and maintaining a road pavement demolished by lorry traffic to and from the company's factory)

(ii) provides a shorter turnover time of the capital in the circuit flow, and thus increases the profit rate.

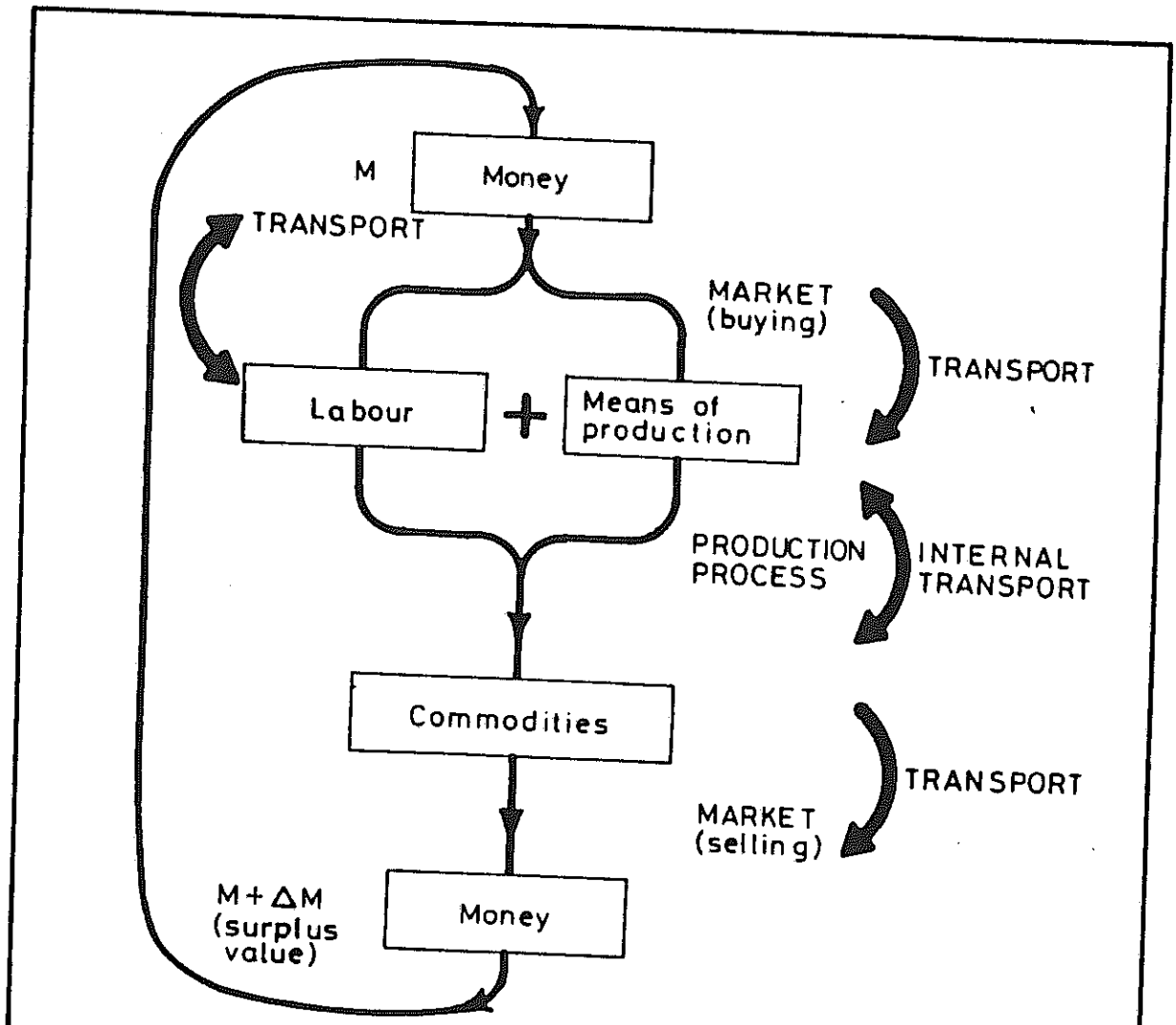


FIG. 1.2: TRANSPORT IN THE CIRCUIT FLOW OF CAPITAL

Transport as infrastructure.

In this paper the comprehensive infrastructure concept is defined to be identic to the common conditions of production, circulation and reproduction. The infrastructure contains both an institutional and a material part. The material infrastructure is also called physical infrastructure.

If the infrastructure serves production and circulation purposes it is termed as economic infrastructure, and if it serves reproduction purposes it is called social infrastructure.

	INSTITUTIONAL INFRASTRUCTURE	MATERIAL/PHYSICAL INFRASTRUCTURE
ECONOMIC INFRASTRUCTURE = common conditions of production	Transport management and administration	Transport system (fixed and moving facilities)
SOCIAL INFRASTRUCTURE = common conditions of reproduction	Traffic legislation Transport planning	
	Transport policy ↑ ↑ (e.g. resource allocation of investments, fare- and price policies, technical-administrative regulations)	

FIG. 1.3: THE INFRASTRUCTURE CONCEPT - A SOCIO-ECONOMIC PARADIGM

Normally all fixed facilities of a transport system are material infrastructure, as they are collectively utilized or consumed without any purpose of gaining profit.
A transport system, a supply system (e.g. water, energy), a sewerage or a communication system often acts both as economic and social infrastructure.
Economic transport infrastructure serves production processes and commercial activities, and social transport infrastructure serves the reproduction activities like education, health, recreation and other social functions.

From an economic point of view the direct transport production and service related to the transport system might occur either as a commodity, as infrastructure, or as a social (i.e. a non-economic) activity.
The transport service is "a commodity" if it is produced and sold (offered) by private/public companies with the aim to maximize profit, e.g. private taxi- or bus-service operating on financial terms.
The transport service is "infrastructure", if it is produced by the public (government, city council etc.), and the main purpose is not financial but to provide a service to satisfy social needs for the transport. An example is a publicly owned and operated bus company subsidized in

An individual bicyclist performs an activity which can be characterized neither as a commodity nor infrastructure. However, there are exceptions, e.g. a postman on a bicycle is a part of a postage infrastructure system.
But the individual transport activity of a bicyclist or a pedestrian still has a tremendous social and economic impact, though it is formally considered as a non-economic activity.

Urban passenger transport.

Roughly the urban transport activities can be divided into two categories, i.e. commercial transport and passenger transport.

Commercial transport provides all external transport of goods and services between different production units, and between the production units and the market.

Passenger transport contains both an economic category of trips and a social category of trips.
The economic category is the commuter trips, i.e. the daily transport of labour between the residential areas and the work places.
The social category is the daily transport of people between the residential areas and the market and social services (e.g. home - shopping trips, home - recreation trips, home - education trips etc.), and social trips between different residential areas.

FACTORS OF GROWTH IN URBAN TRANSPORT.

Urban population growth and physical expansion.

The overall factor leading to a fast increasing need for urban passenger transport is the urbanization appearing as a combined process of rural-urban migration, physical expansion of urban areas, and an increased level of socio-economic activities.

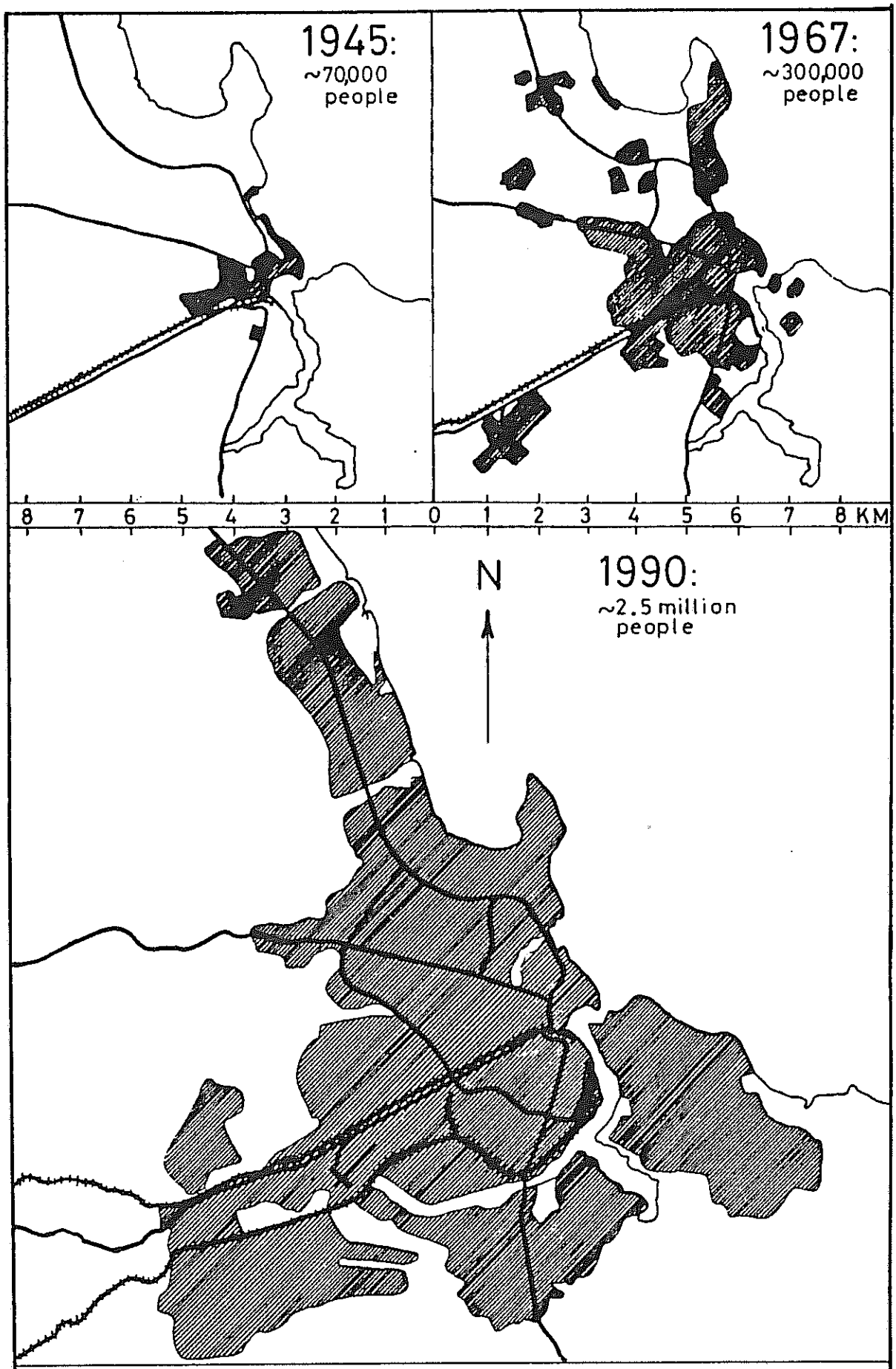


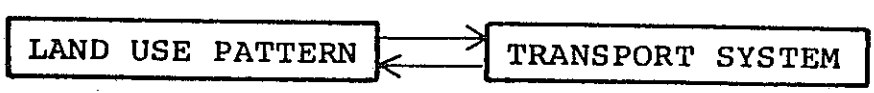
FIG. 1.4: PHYSICAL DEVELOPMENT OF DAR ES SALAAM, TANZANIA

As people migrate from rural to urban areas, and from smaller settlements to larger towns more and more people need daily transport in order to be able to reach the work places, institutions, markets, and service facilities from their homes.
The related physical expansion of the urban areas causes a significant increase of the average daily trip length especially for urban low-income commuters.
And more and more people cannot any longer reach the daily activities and destinations by foot.

Transport and urban land use pattern.

As mentioned previously, transport enables activities and resources - that occur in different places - to combine through the physical movement. Transport systems combine in space and time by the movement of people, services and goods through a transport network (road, rail or water channels).
Also pipeline networks can be considered as a special type of transport networks often used for the flow of waste water, energy sources and water supply.

As traffic is a symptom of socio-economic activities, it is obvious that neither land-use nor a transport system can, on its own, cause or generate traffic.
The amount of traffic that occurs, is determined by the land use potentials which could be called the "demand" for transport facilities and services. The amount of traffic is also determined by the capability and service-level of the transport system which could be called the "supply" of transport facilities and services.
This implicates that urban land use patterns and urban transport systems are mutually influencing each other:



Land use and transport form a complementary system.
The geographical location of economic activities in an urban area has a crucial effect on the amount and pattern of traffic flows.
Or with other words, the land use pattern influences the structure of and requirements to the transport system.
On the other hand the capability and costs of transport facilities will affect the land use pattern considerably.
Thus the transport system can be deliberately used by physical planners as a mean of structuring the urban land use pattern.

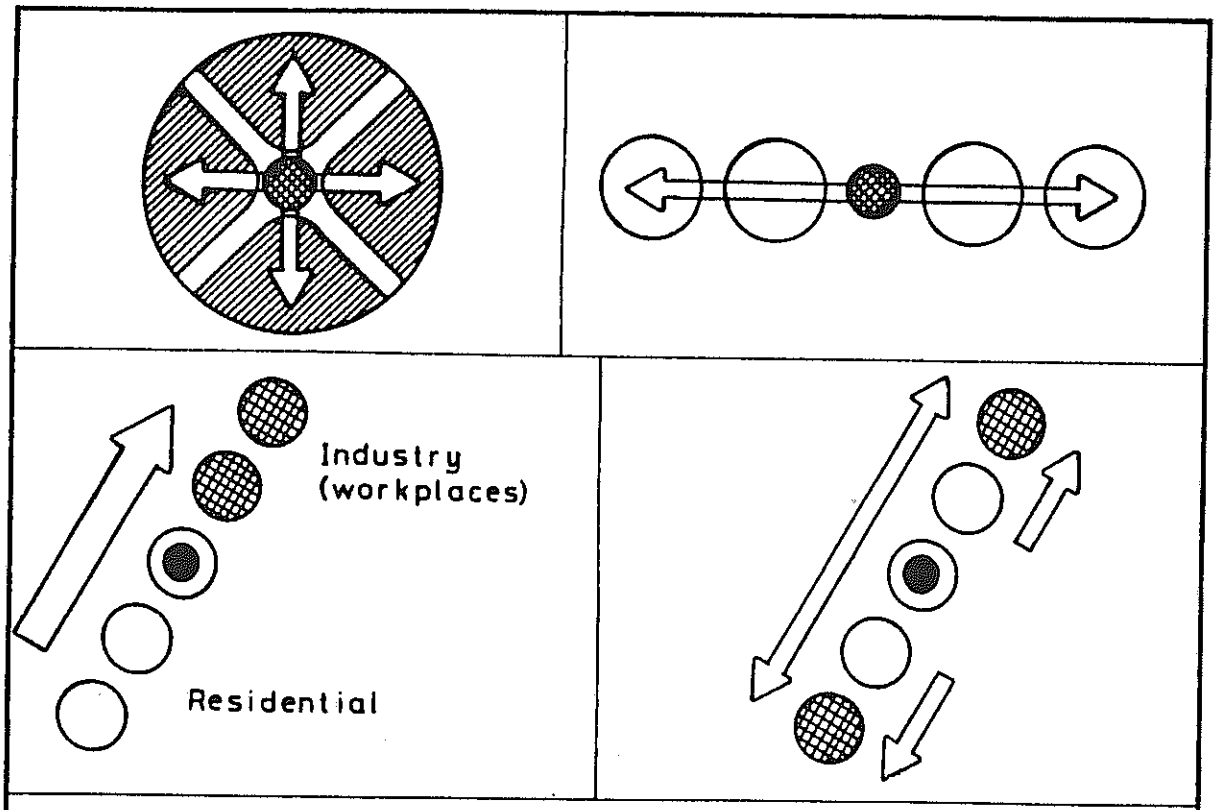


FIG. 1.5: CONCEPTUAL PHYSICAL DEVELOPMENT STRUCTURES AND TRANSPORT FLOWS

Demand factors related to urban land use structure.

Apart from the urban population growth some general tendencies in physical development of urban areas stimulate and increase the need for urban passenger transport significantly above the level to be immediately expected due to mere population growth

These tendencies are supported by principles applied in traditional urban master planning. The following tendencies characterize the physical development of urban areas in most types of both industrialized and developing economies:

(1) physical concentration of production units and service facilities,

(2) functional and geographical separation of different categories of land use,

(3) socio-spatial segregation of urban dwellers into low-income residential areas, medium-income-, and high-income areas,

(4) overlapping "labour markets",

(5) urban sprawl.

Re (1): Physical concentration.

When production and service functions are being physically concentrated in order to obtain large scale advantages, the transport work per produced unit will increase rapidly.

Example:

Stationary fruitsellers located along a beach or a street with an even distribution of buyers:

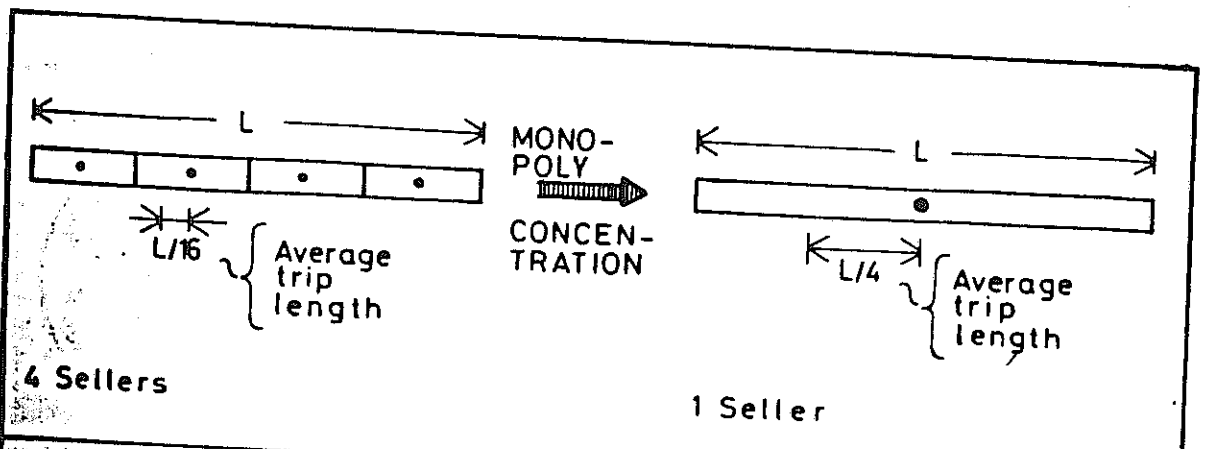


FIG. 1.6: PHYSICAL CONCENTRATION AND ITS IMPACT ON TRIP LENGTHS

If the 4 units are concentrated to 1 unit centrally located in the area the average distance for the buyers will increase fourfold.

Re (2): Functional separation.

Functional integration means that the residents and workers of the town can reach the urban activities - which they daily join - such as residence, workplaces, schools, shopping centres and recreation - within an area of limited physical extension.

Functional separation means that specific functions for the whole town or a larger urban district are located in specific areas, and with relatively long physical distances between the various functions or land use activities which the residents and workers need to reach daily. This principle of functional separation into special areas for centre functions, residence, commerce, industry and institutions implies increasing lengths of daily trips within the town or urban area:

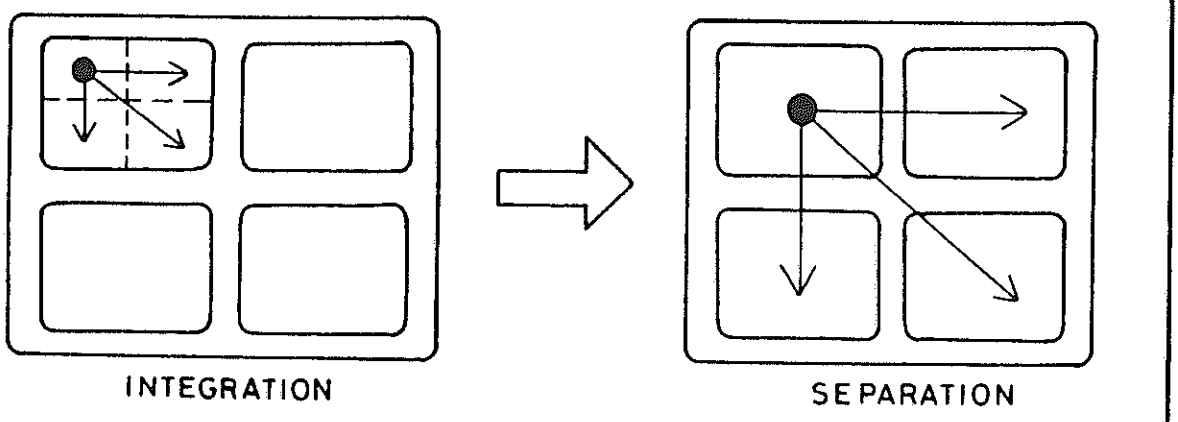


FIG. 1.7: PHYSICAL INTEGRATION VERSUS PHYSICAL SEPARATION - IMPACT ON DAILY TRIP LENGTHS

Functional separation is stimulated by a continuing development of labour division and specialization.

Re (3): Socio-spatial segregation.

The disparity regarding incomes and privileges and the competition for plots and houses will stimulate a land use pattern with a socio-spatial segregation, i.e. development of special low-density areas (for high-income groups), medium-density areas (for middle-income groups) and high-density areas (for low-income groups).
Also ethnic, cultural and religious differences can stimulate socio-spatial segregation.
Often the low-income groups are forced to move to less attractive areas, i.e. high-density areas develop in relatively long distances from the public service facilities in the city centre. At the same time more centrally located residential areas might be occupied by low-density housing, all contributing to an increase of the average trip length and the total transport work especially for the huge masses of low-income commuters.

Re (4): Overlapping labour markets.

This tendency of overlapping markets is made possible as far as the commercial transport is concerned by rationalization of transport services and low transport costs per unit compared to production costs per unit.
The overlapping tendency also applies to labour markets, i.e. there is no balance between labour and workplaces within each urban district or sub-district. The districts are exchanging labour, i.e. commuting takes place to a very high degree between the various urban districts.

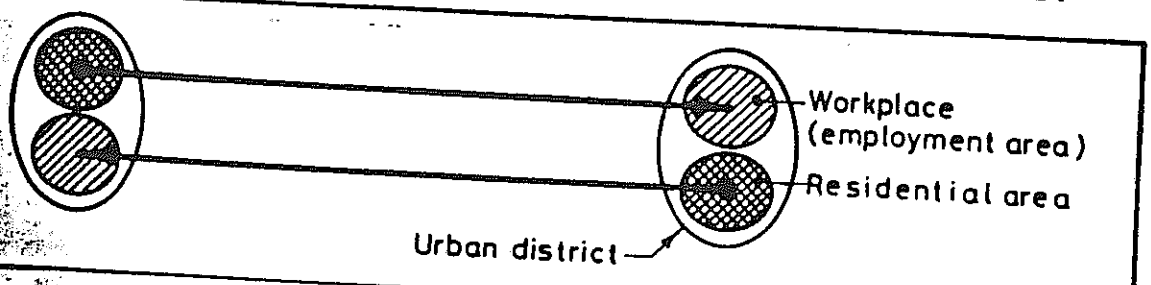


FIG. 1.8: OVERLAPPING LABOUR MARKETS - INCREASING COMMUTING

Also this tendency is stimulated by the increasing labour division and specialization.

Urban passengers waiting for bus transport in Dar es Salaam, Tanzania.

Re (5): Urban sprawl.

The tendency of urban sprawl applies especially to residential areas. Urban sprawl is stimulated by an increased private car ownership.

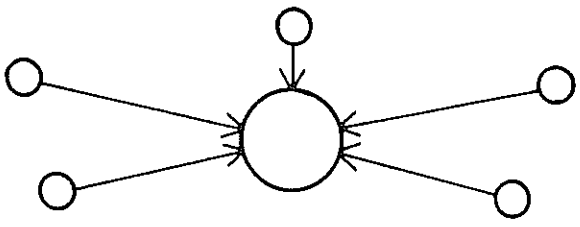
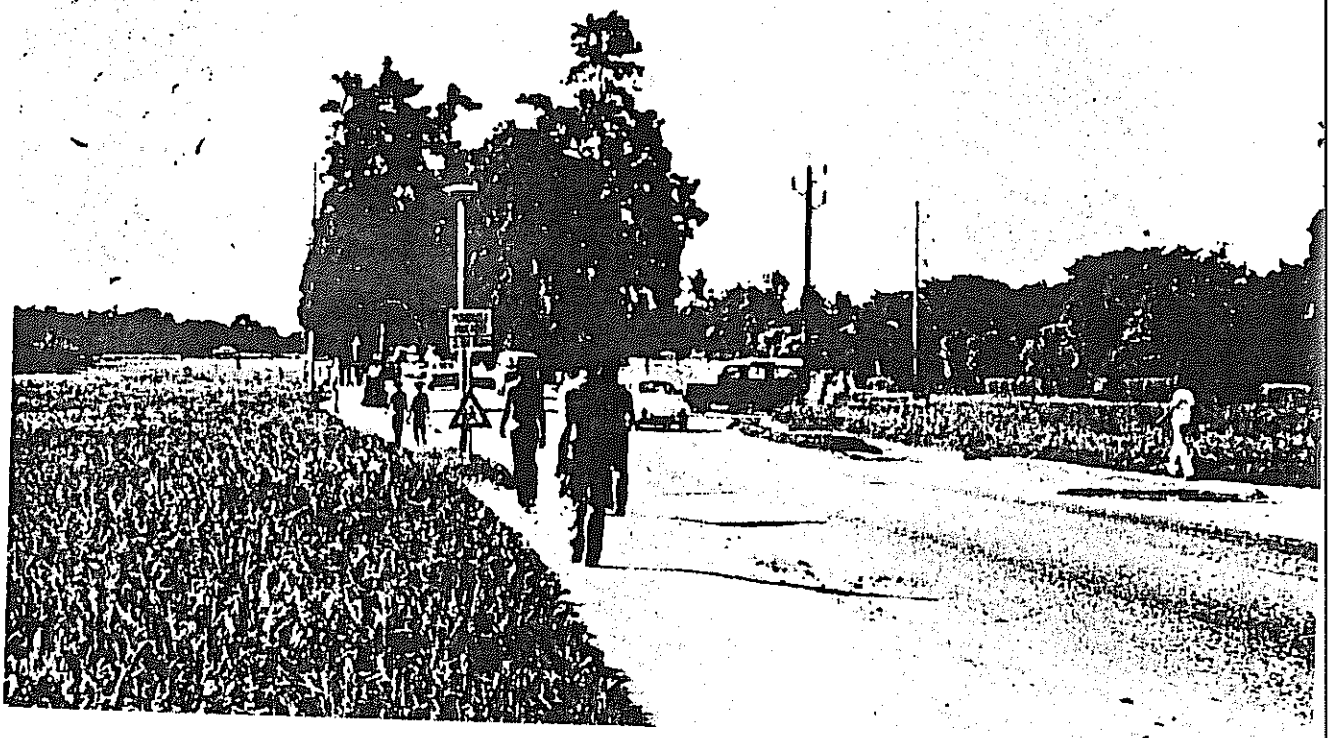


FIG. 1.9: URBAN SPRAWL - INCREASING COMMUTING



Commuters walking along Bagamoyo Road in Dar es Salaam, Tanzania.

CHAPTER 2

URBAN TRAFFIC CHARACTERISTICS

INTRODUCTION.

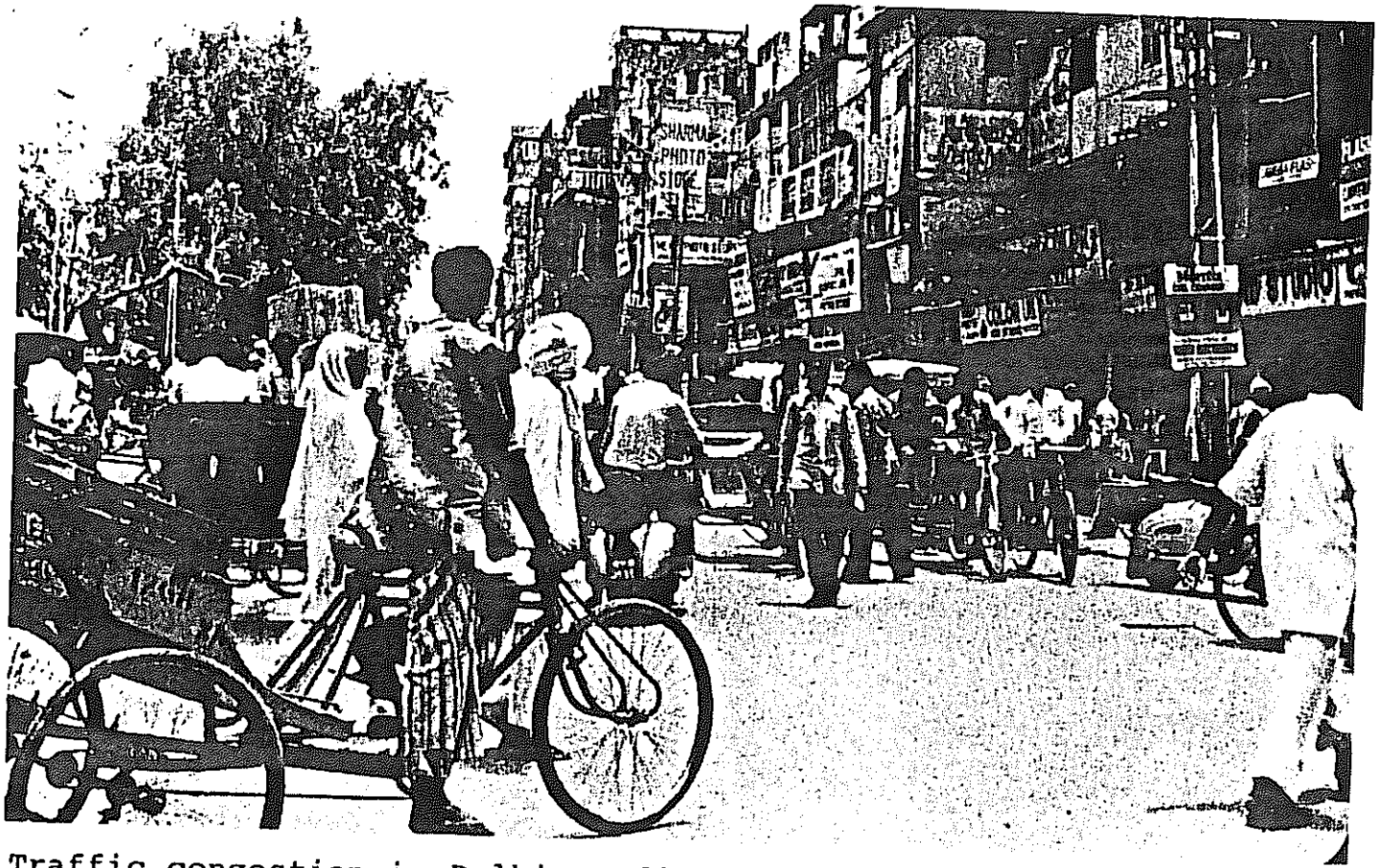
Urban areas in developing countries are generally characterized by transport conditions and a travel pattern significantly different from the characteristics of cities and towns in industrialized countries.
Also the population is more heavily affected by negative effects from motorized traffic.
The chapter presents a brief description of some major traffic problems, and the specific socio-economic and physical conditions which in developing countries characterize urban travel pattern and transport systems.

TRAFFIC PROBLEMS.

Traffic congestion in central areas.

Heavy traffic congestions occur frequently in the central areas and along the major roads of larger towns and cities in developing countries. This is in spite of the fact that the overall car density is low.
The reasons are that the street network is of a limited extent compared to the population size, the streets are narrow and appearing with unrestricted on-street parking, the junctions are often insufficiently designed and introduce bottlenecks into the network, the activities along the streets stimulate random crossings of pedestrians, and the motor vehicle fleet is more intensively used. All these factors contribute to the congested and caotic traffic situation in the central urban areas.

Traffic congestion in Penang, Malaysia.



Traffic congestion in Delhi, India.

High accident rates.

Traffic accidents happen relatively much more frequently in developing countries than in industrialized countries. Traffic accidents are in fact able to "compete" with several of the most serious diseases (tuberculosis, malaria etc.) as a main cause of death.

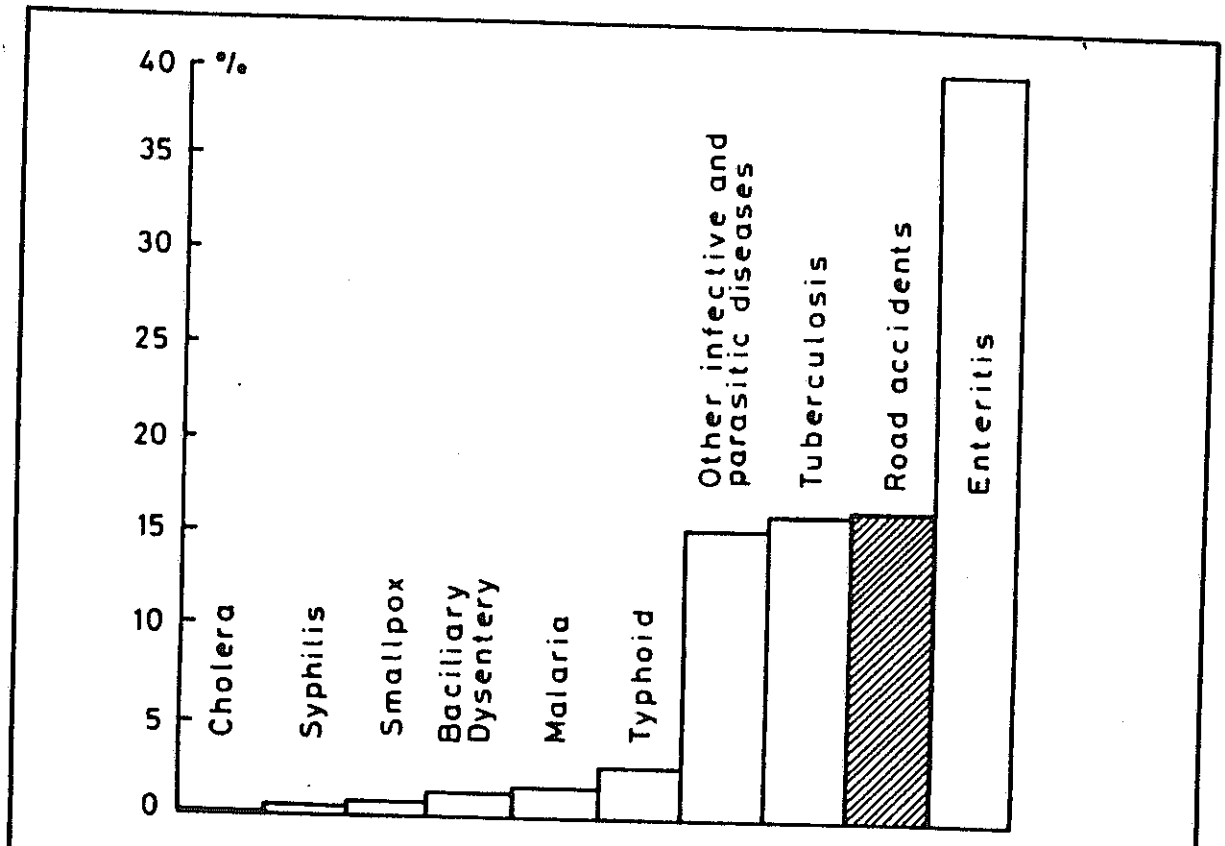


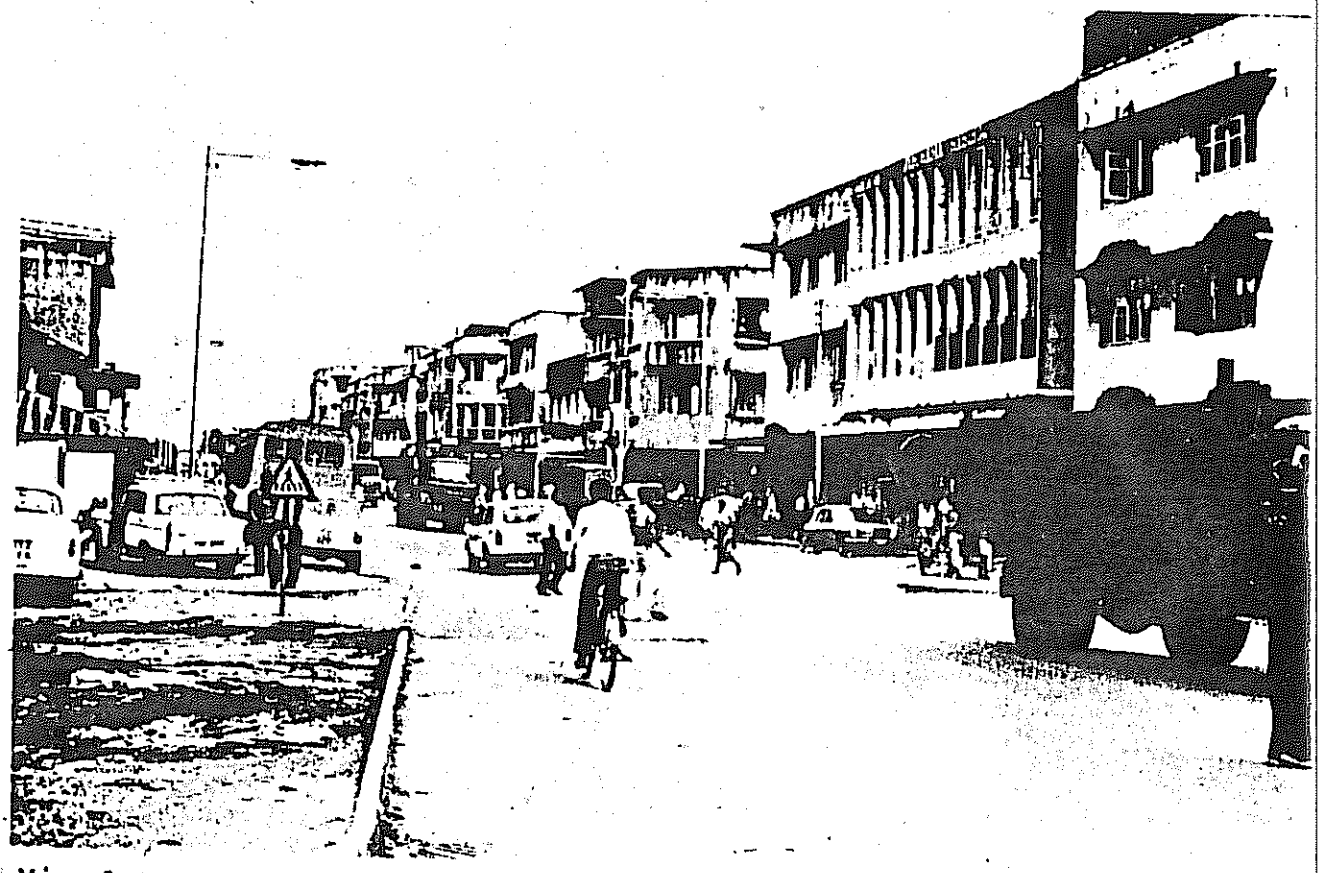
FIG. 2.1: PERCENTAGE OF DEATHS DUE TO VARIOUS CAUSES IN 15 DEVELOPING COUNTRIES [source: (6)]

Inadequate transport systems.

The road- and street-networks are often inadequate to cope with even a low level of motorvehicle traffic. Due to limited funds and lack of maintenance organization the existing network is furthermore deteriorating rapidly in the urban areas of the least developed countries.

The capacity of the public bus transport system is far from sufficient to meet the demands, resulting in long

Queues at a busstop in Dar es Salaam, Tanzania



Mixed traffic and a poor road surface condition, Dar es Salaam, Tanzania.

queues and waiting time at the bus stops. And overfilled buses often carry a number of passengers exceeding the capacity by 50 - 150 percent.

TRAVEL PATTERN.

The socio-economic conditions of households.

The main part of all passenger trips are home-based, i.e. the urban household is considered as the most important trip producing unit.

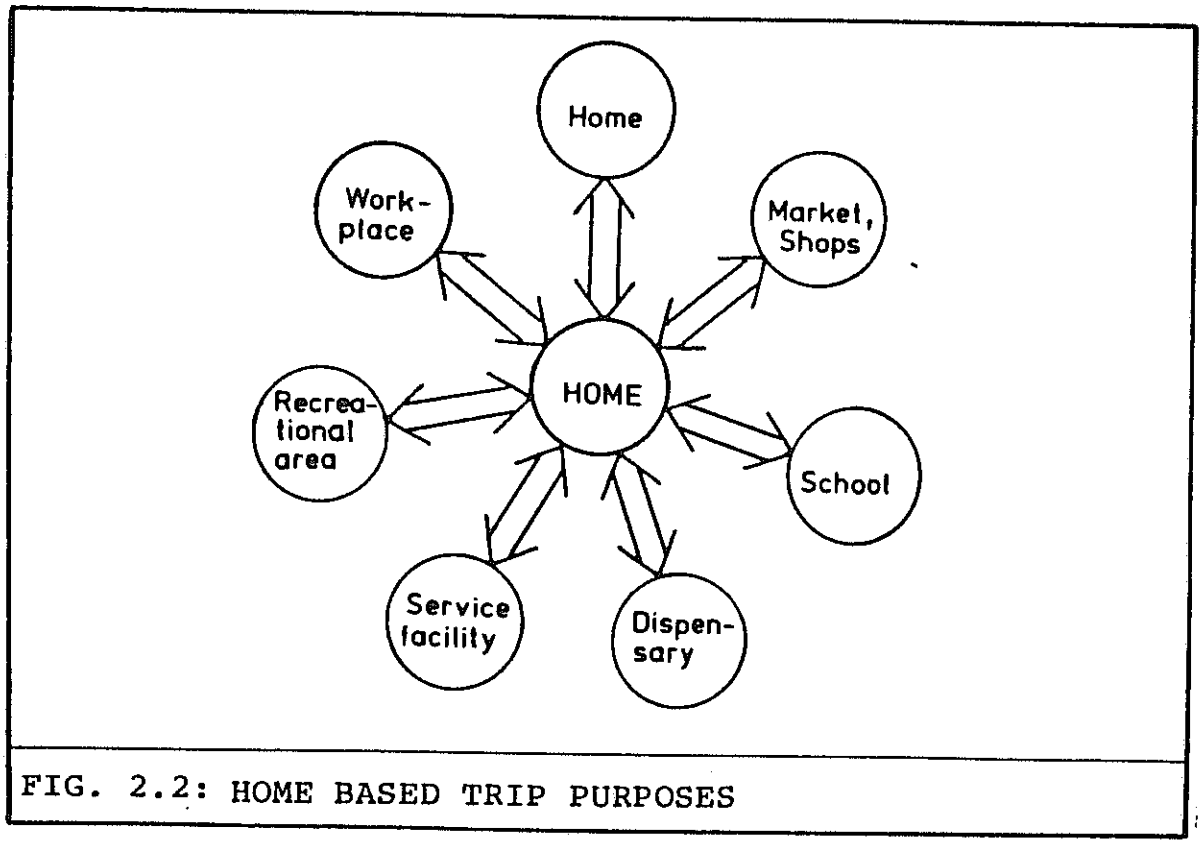


FIG. 2.2: HOME BASED TRIP PURPOSES

The number of trips produced per household per day generally increases with increased household income. Furthermore, the trip production is higher for developed countries, even when the household income is the same, because of a higher level of economic activity.
The difference is even more significant considering that the household size of developing countries is higher.

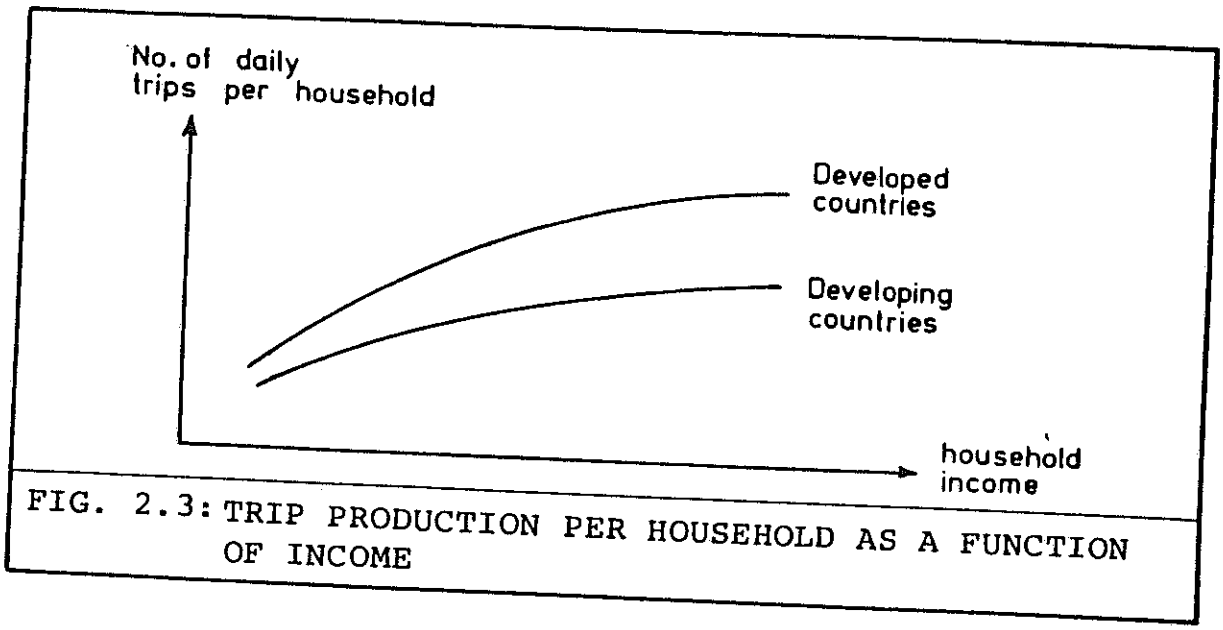


FIG. 2.3: TRIP PRODUCTION PER HOUSEHOLD AS A FUNCTION OF INCOME

For industrialized countries the households are characterized by small, nuclear families (2 - 4 persons), a high average household income, and a high degree of car ownership.
For developing countries the households have many children and often consist of extended families (5 - 10 persons), the average household income is low, and there is a low degree of car ownership.

Car densities.

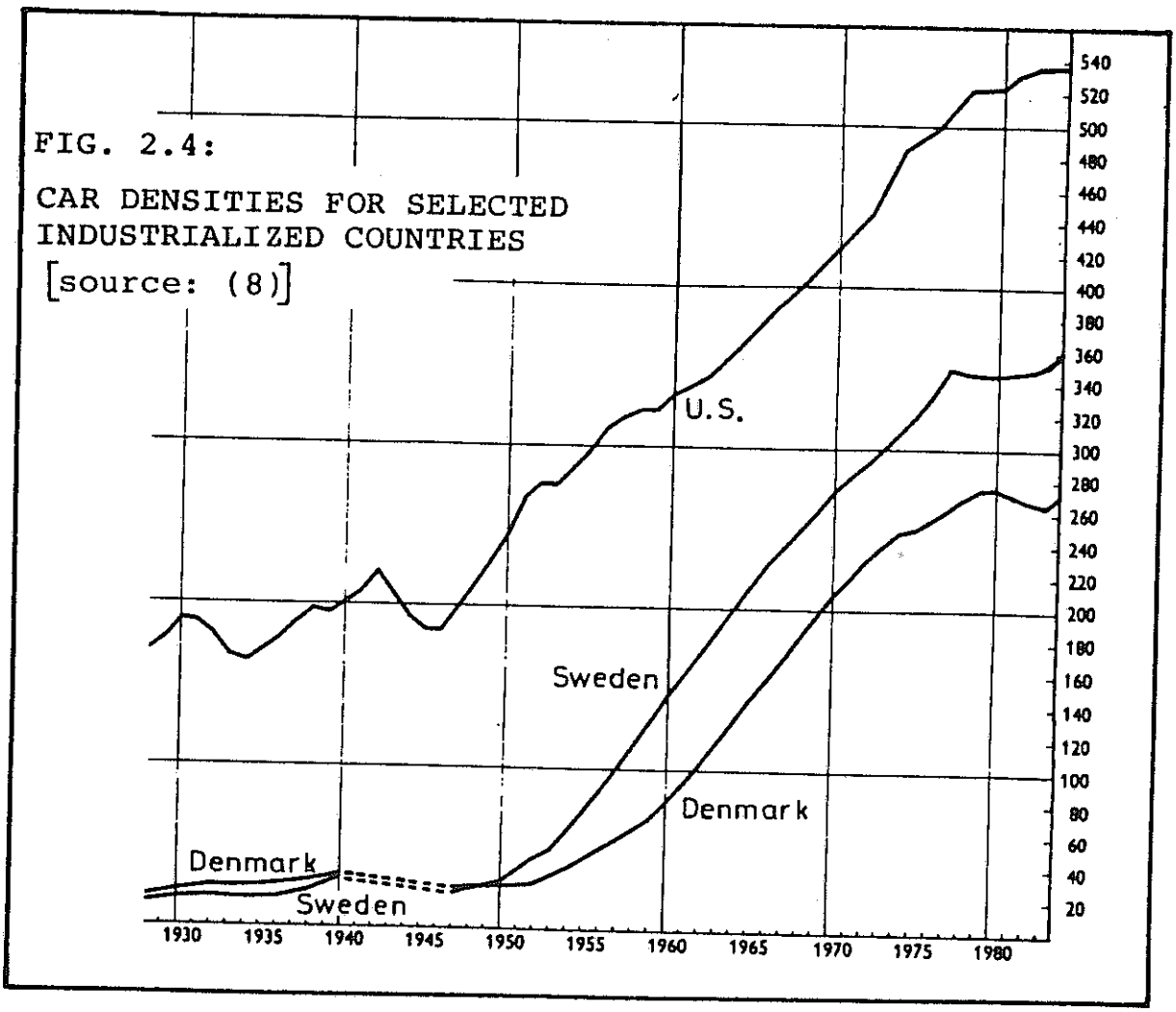
To describe the geographical (spatial) distribution of the vehicle population, and as a comparative measure we need to introduce the concept car density.
The car density is defined as the number of motor vehicles per 1000 people.
The gross density includes the total number of motor vehicles, i.e. both commercial vehicles like buses, taxis, lorries and vans, and private/individual passenger cars. Also the net density, only including passenger cars, is a commonly used statistic figure.

Passenger cars is a dominating part of the total motor vehicle fleet in industrialized, capitalist countries, and therefore often the net-figures for passenger cars are applied for these countries.

In most of the developing countries and in industrialized, centrally planned countries commercial vehicles contribute to a significantly higher percentage of the total vehicle fleet. Thus, for these countries it is more adequate to use gross densities.

The industrialized, capitalist countries (i.e. U.S., Western Europe, Japan etc.) have extremely high car densities compared to developing countries, see the graph below.

FIG. 2.4:
CAR DENSITIES FOR SELECTED INDUSTRIALIZED COUNTRIES
[source: (8)]



The following comparative figures of gross densities give an idea of the extremely huge gap between industrialized, capitalist countries and the developing countries, as far as car densities are concerned:

Western, capitalist countries	200-500 cars per 1000 people
Developing countries	5- 50 - - - -
Least developed countries	5- 10

URBAN TRANSPORT TECHNOLOGY.

Basic concepts.

In this paper technology is understood as the total system of technique, organization, and knowledge applied to obtain a specific product or service of transport.
The fourth but essential element in this system is the functional characteristics or achievements of the final product:

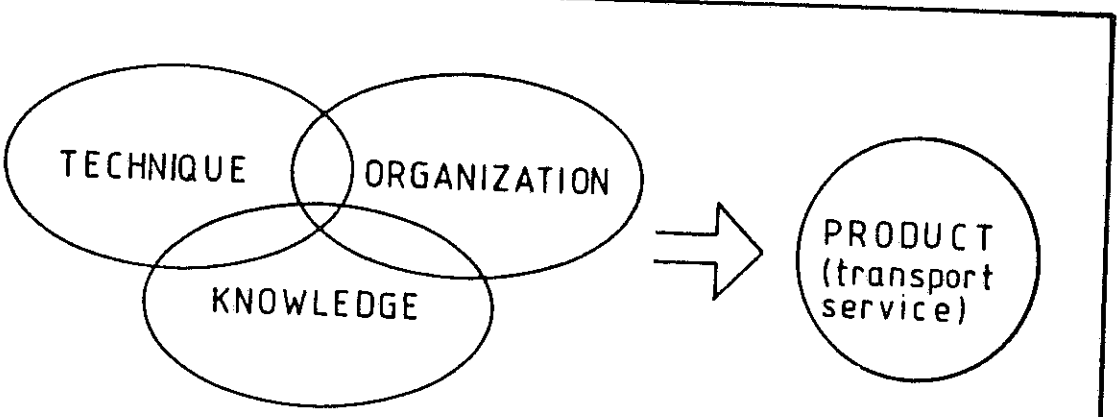


FIG. 2.5: THE TECHNOLOGY CONCEPT [source: (2)]

A transport development project can be considered as a comprehensive product. The overall production of transport service takes place both in the construction phase of the project, and in the operation phase.
The design and construction of fixed facilities (e.g. a road network) provide the basic functional requirements for the total transport system. But also the purchase or production and operation of a motor vehicle fleet (e.g. passenger cars, buses), as well as the maintenance of the vehicle fleet and fixed facilities, constitute a considerable share of the total resource consumption. The category of vehicles and the organization of the operations characterize the main part of the final transport service.

Within the transport theory field a specific vocabulary has developed, and to avoid too much confusion the traditional terminology should be introduced together with the general technology concept.
The two concepts "mean of transport" and "mode of transport" are frequently used in descriptions and analyses of urban passenger transport.

A mean of transport is the type of vehicle which is applied to carry out a specific transport task, for example a bus, a passenger car, a rickshaw or a bicycle.
Hence the mean of transport is the technique used by the driver (labour) in order to produce the specific transport service.

A mode of transport is the way of carrying out the transport task. This more comprehensive concept includes the total transport system representing that specific mode, i.e. both the moving vehicles (the means), the share of physical infrastructure (fixed facilities like road- or path-network, bus stops), and the organization of the transport (e.g. time schedules, staff, repair workshops for public buses).
The mode of transport comes close to the general technology concept which includes the elements of technique, organization, knowledge, and functional characteristics of the transport system.
Thus, mode of transport and transport technology can be considered as synonyms.

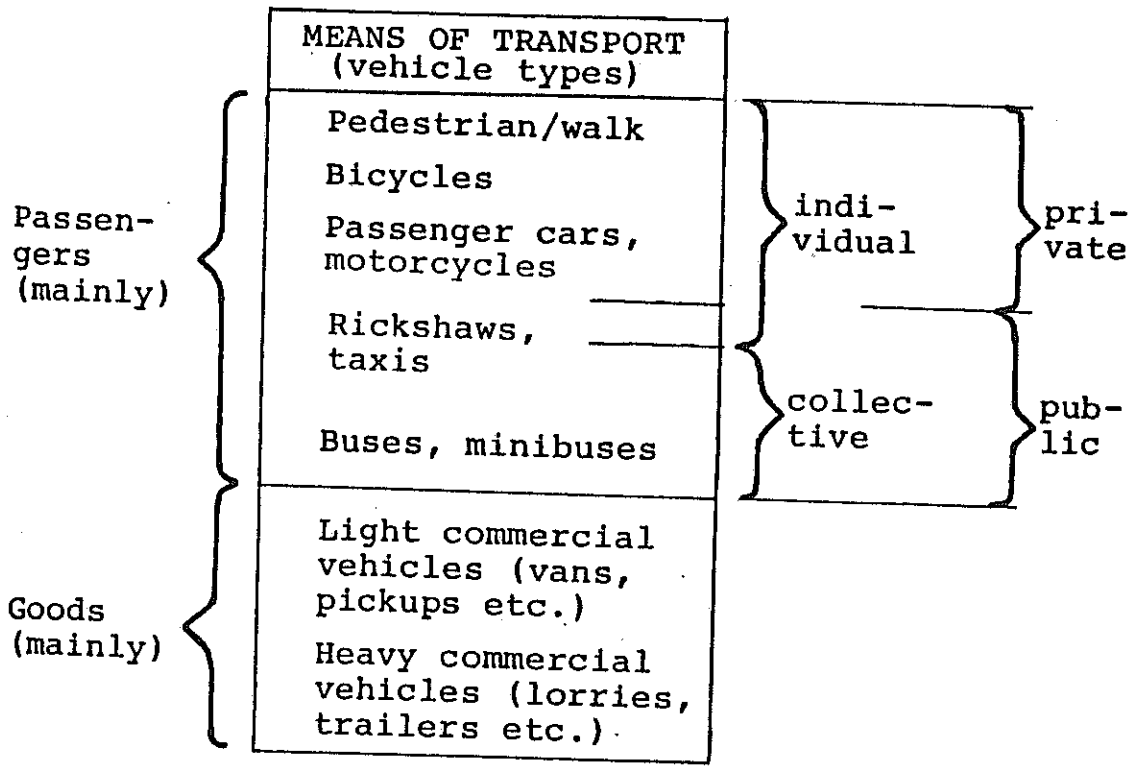
A trip is defined as the movement of one person in one direction between two points and without any important intermediate stops between the origin and the destination of the trip.
A trip is the basic measuring unit to quantify passenger transport, and to describe travel pattern characteristics, e.g. distribution of trips on different modes or tech-

Modes of transport.

Urban passenger transport can be considered as a comprehensive system which consists of several subsystems or modes of transport.
The following five modes of transport normally play the most important role in urban passenger transport:

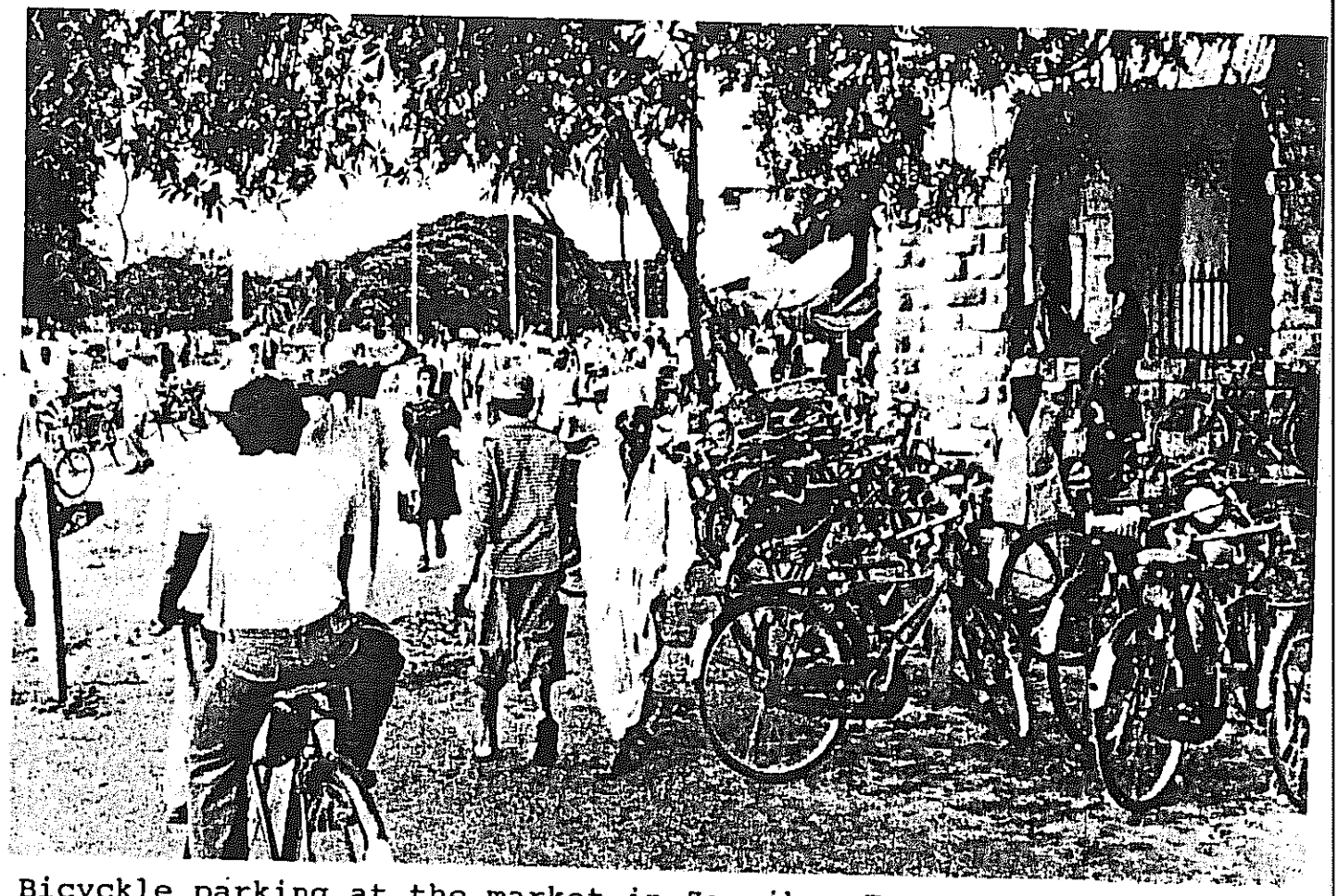
- pedestrian movements
- bicycle transport
- intermediate public transport (rickshaws, taxis etc.)
- public bus transport (incl. minibuses)
- individual car transport.

The urban transport system contains the following elements:

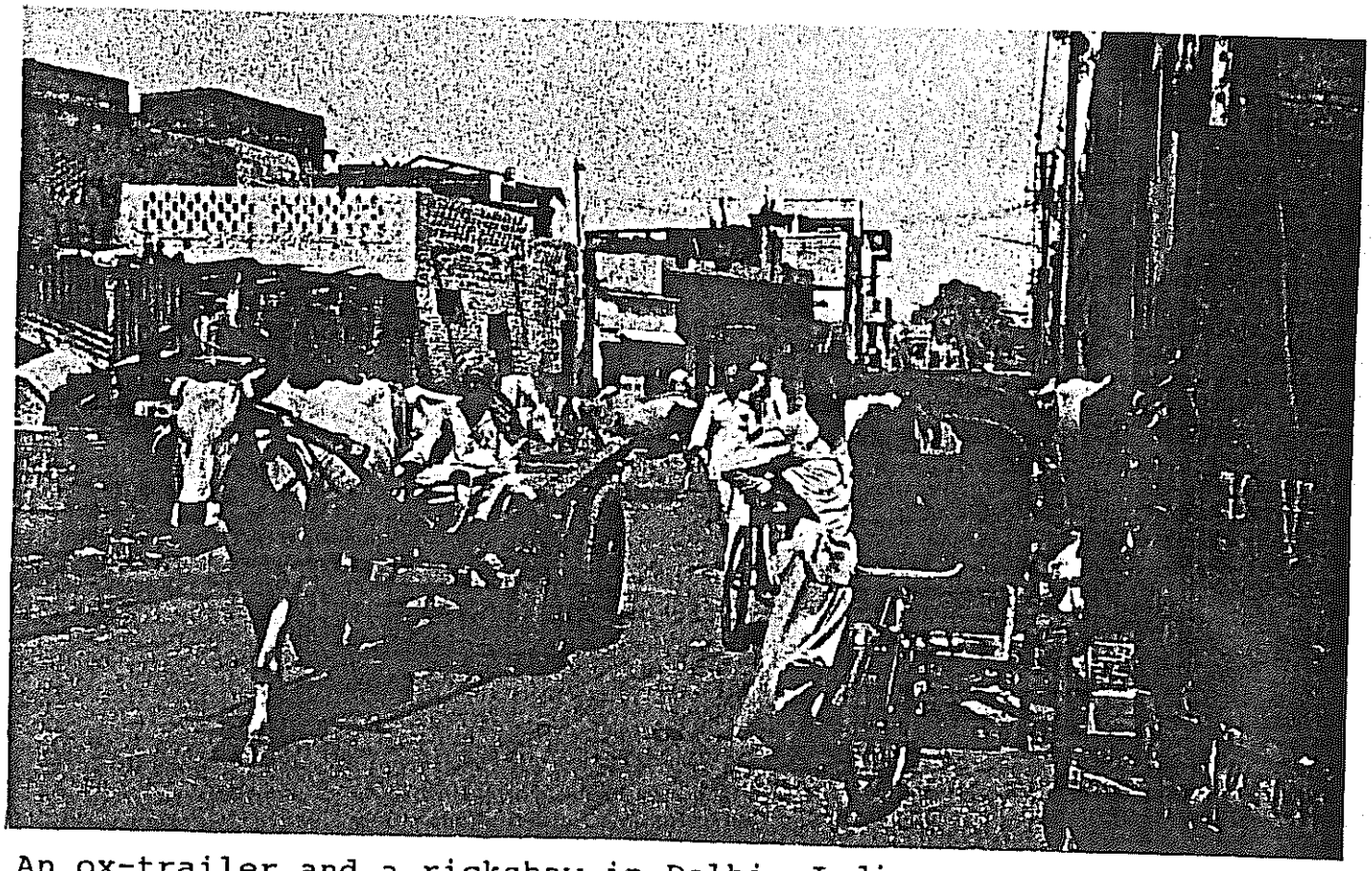


Functional subsystems.

The urban transport can be functionally subdivided into two main-systems which imply different requirements to the fixed transport facilities:



Bicyckle parking at the market in Zanzibar Town.



An ox-trailer and a rickshaw in Delhi, India.

(1) An urban mass transport system for passengers. This system comprises pedestrian movements, bicycle transport, and public transport including intermediate means like rickshaws, taxis, minibuses and conventional buses.

(2) A car transport system mainly for individual commuting and commercial purposes. This system comprises:

- private and company motor vehicles for individual transport of people (passenger cars),
- light commercial vehicles for distribution of commodities and services,
- lorries, trailers, tankers etc. for heavy goods transport.

Means of public transport.

New techniques have been introduced on an experimental basis over the past 20 years, but they would need large initial investments, and are therefore economically difficult to implement especially in developing countries. Rail transport (trams, trains) are technologically and economically suitable for cities of the million size. In USA the criterion for construction of urban railways is an urban population size of 2 million inhabitants. In USSR, where the passenger car density is not much higher than in many developing countries, urban railways are planned for several cities of around 1 million people.

Some European cities of less than 1 million people have tramway systems, but these systems have been inherited from the period prior to the growth of passenger car traffic, and thus the needs for investments in basic infrastructure and new land use requirements to maintain the system have been small.

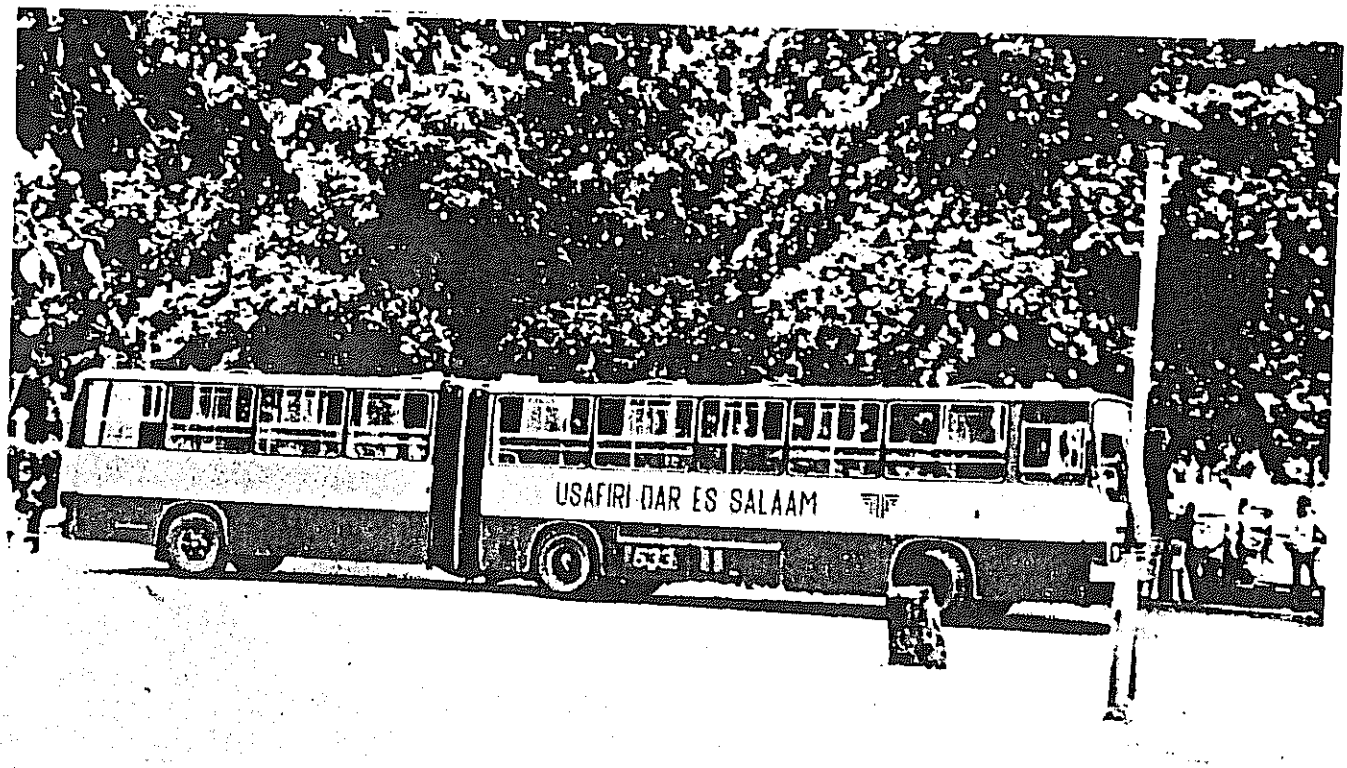
Another thumb rule for construction of urban railways is that the peak hour traffic volume should exceed 5,000 passengers per line in each direction during the initial years and with an anticipated rapid increase in the following years.

Many cities in developing countries already fulfil these criteria.

In Calcutta, India suburban railways are already under construction, and it is being considered to introduce such systems in other huge cities too.

However, lack of investment funds is a primary obstacle for all developing countries.

Hence the most realistic mean or technique of urban public transport to expand in the least developed countries will be the urban bus.



An articulated bus in Dar es Salaam, Tanzania.

TRIP DISTRIBUTION ON MODES OF TRANSPORT.

The actual trip distribution on modes differs much from country to country and from town to town.

In industrialized, capitalist countries individual

transport is a dominating mode of urban passenger transport, i.e. contributing to 50-60 percent of the total trip production.
In developing countries the other modes of transport, especially walk and public bus transport, dominate. Various intermediate public transport systems dominate in several towns and cities in Asia, whilst cycle- and motor-rickshaws are not represented to any significant degree in African countries south of Sahara.

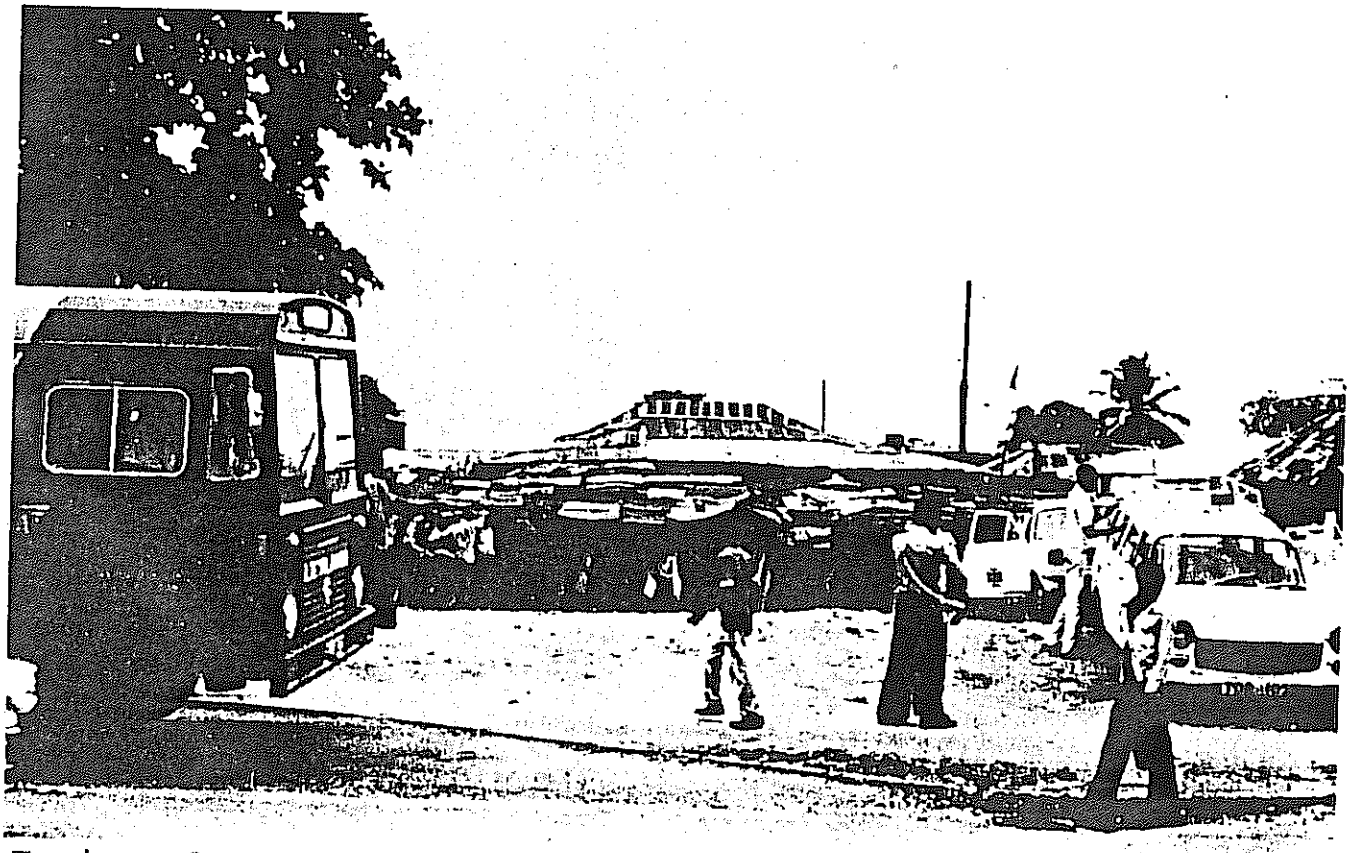
Individual car transport.

In most larger towns and cities of the least developed countries individual car transport only contributes to a smaller part of the trip production within urban areas, although they dominate the traffic picture in city centres. Individual car transport is nearly negligible in the smaller towns.

Public bus transport.

In all cities of developing countries public bus transport is an important mode of transport. Even in medium sized towns like regional or provincial centres public bus transport might play a role.
Public bus transport includes company organized commuter transport by bus, minibus, and even lorry which is commonly applied in Tanzania.
Also privately owned minibuses (e.g. the "Matatas" in Nairobi, and the "Dala-dalas" in Dar es Salaam) constitute a part of the public transport system. And they are during the recent years more considered as a complementary part of the system than as a competing mean to the conventional buses.

Minibuses in Kuala Lumpur, Malaysia.

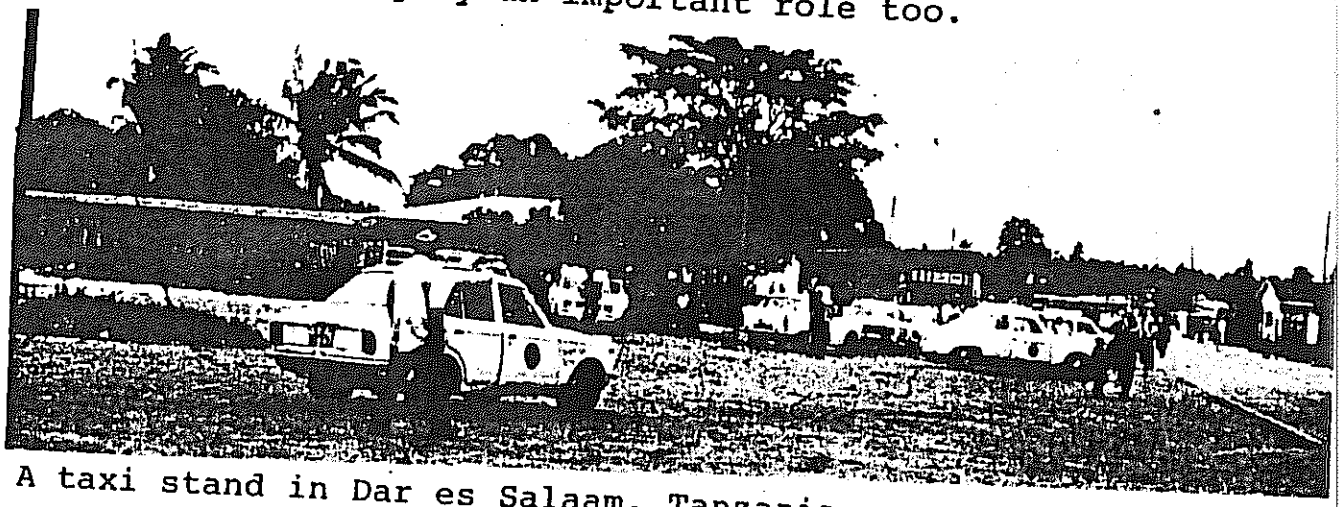


Taxis and a public bus at Kariakoo Market in Dar es Salaam, Tanzania

Intermediate public transport.

Taxis is the only category of intermediate public transport represented in most African cities south of Sahara.

In Asia rickshaws play an important role too.



A taxi stand in Dar es Salaam, Tanzania.

Cycle rickshaws in Delhi, India

Bicycle transport.

In India and China bicycle transport and bicycle drawn rickshaws are dominating modes of passenger transport. Bicyclists contribute to a significant part of the total trip production.

In Africa the extent of bicycle transport differs much from country to country, and from town to town.
In Nairobi (Kenya) bicycle transport is nearly negligible, in Dar es Salaam (Tanzania) it is modest but noticeable.
In Harare (Zimbabwe) bicycle transport is more common but not dominating.

Bicycles and motor bikes parked in Kathmandu, Nepal

Pedestrians.

Walk is still the major mean of transport in developing countries in spite of a tremendous physical expansion of urban areas and a related increase in the trip lenghts.

The pedestrian mode of transport is by all means dominating in the central core of the city centres even in industrialized countries.

The influence from land use pattern and distance.

Apart from socio-economic conditions the trip distribution also depends on physical features (climate, topography, land use pattern).

Especially the land use pattern influences the trip lengths, and hence affects the trip distribution on modes too.

The following graph illustrates a hypothetical distribution of modes depending on trip length:

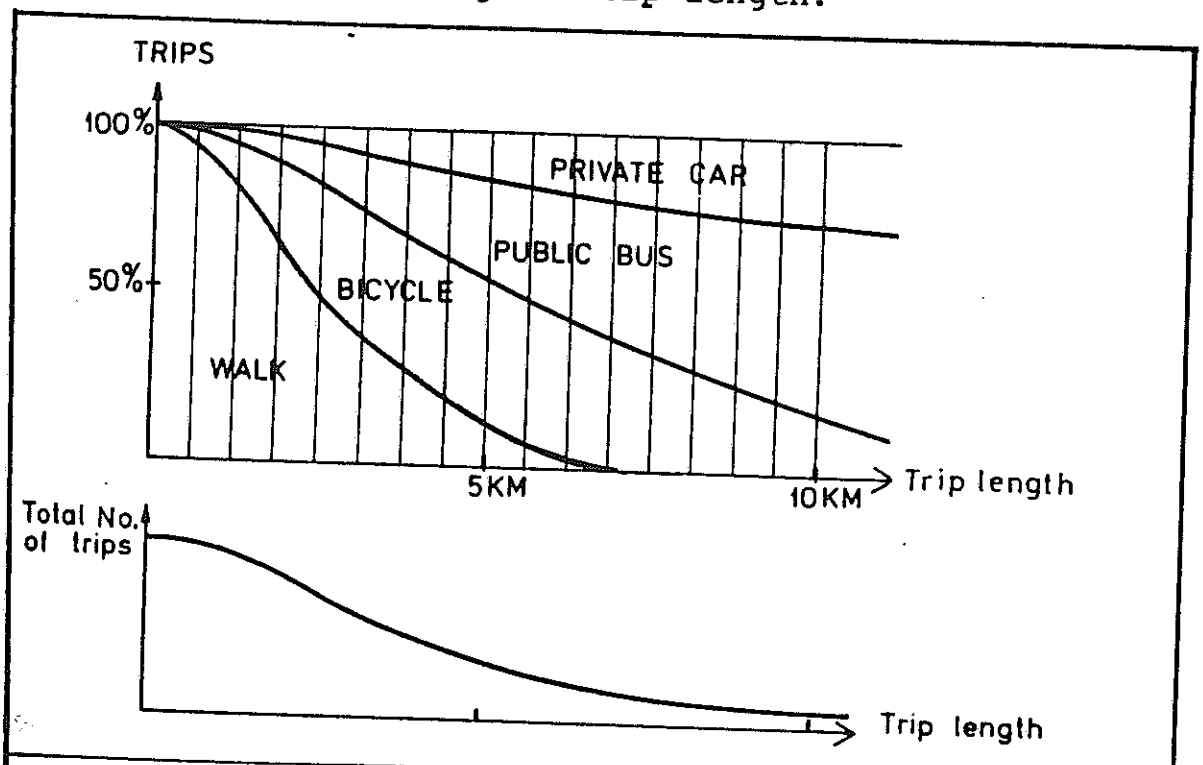


FIG. 2.6: TRIP DISTRIBUTION ON MODES DEPENDS ON THE TRIP LENGTH.

CHAPTER 3

STRATEGIES ON URBAN TRANSPORT

INTRODUCTION.

From an economic point of view the objective of rural development is to stimulate the rural production in order to provide food for a rapidly growing urban population, and to provide surplus value to finance the growing urban productive and non-productive sector.
The rural sector produces whilst the huge urban sector consumes.
Besides, inter-urban links of transport, communication and energy supply have to be developed as a precondition for an overall economic development of a country or a region.
But also the urban infrastructure sector has a strategic importance for economic and social development.
There is an increasing need to provide basic physical infrastructure for the urban poor within housing, water supply, sanitation and transport.
The chapter describes briefly the present policies concerning the technological development of urban transport.
Further, the chapter discusses the need for more comprehensive solutions to the urban transport problem, and sketches some preliminary and tentative guidelines and criteria for identification and selection of projects within this sector.

POLICIES ON TECHNOLOGICAL DEVELOPMENT OF URBAN TRANSPORT.

National policies.

Not many countries are able to present a clear and consistent transport policy, i.e. a policy which is in accordance with a set of formulated political, social and economic goals.

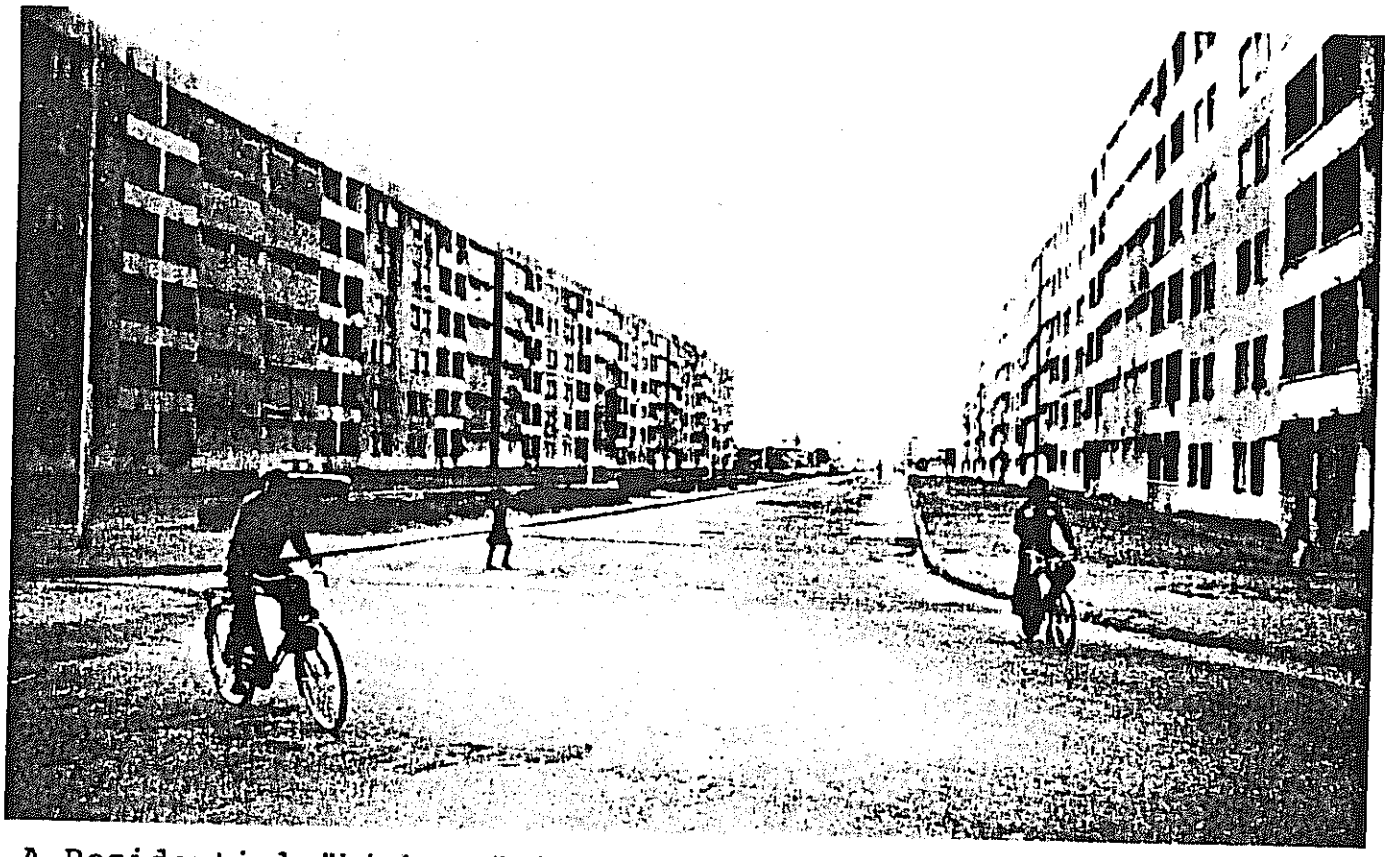
Mostly, the development strategies are exposed only by what is actually being implemented by means of physical planning and investment policy within the physical infrastructure sector.
Also import regulations are efficient means in the actual implementation process of this policy.

Cities, where investment funds are relatively more available than in the least developed countries, rely on an advanced and high standard urban road network, and a public bus system to cater for the mass of urban passenger transport.
Also suburban railways are planned and constructed in a few of the largest cities, e.g. in Singapore.
Bicycle transport is nearly negligible in many cities in this group (e.g. Kuala Lumpur, Nairobi), and neither is it considered in the urban physical planning.
Pedestrian networks are developed to a varying degree especially in the city centres (the Central Business Districts).

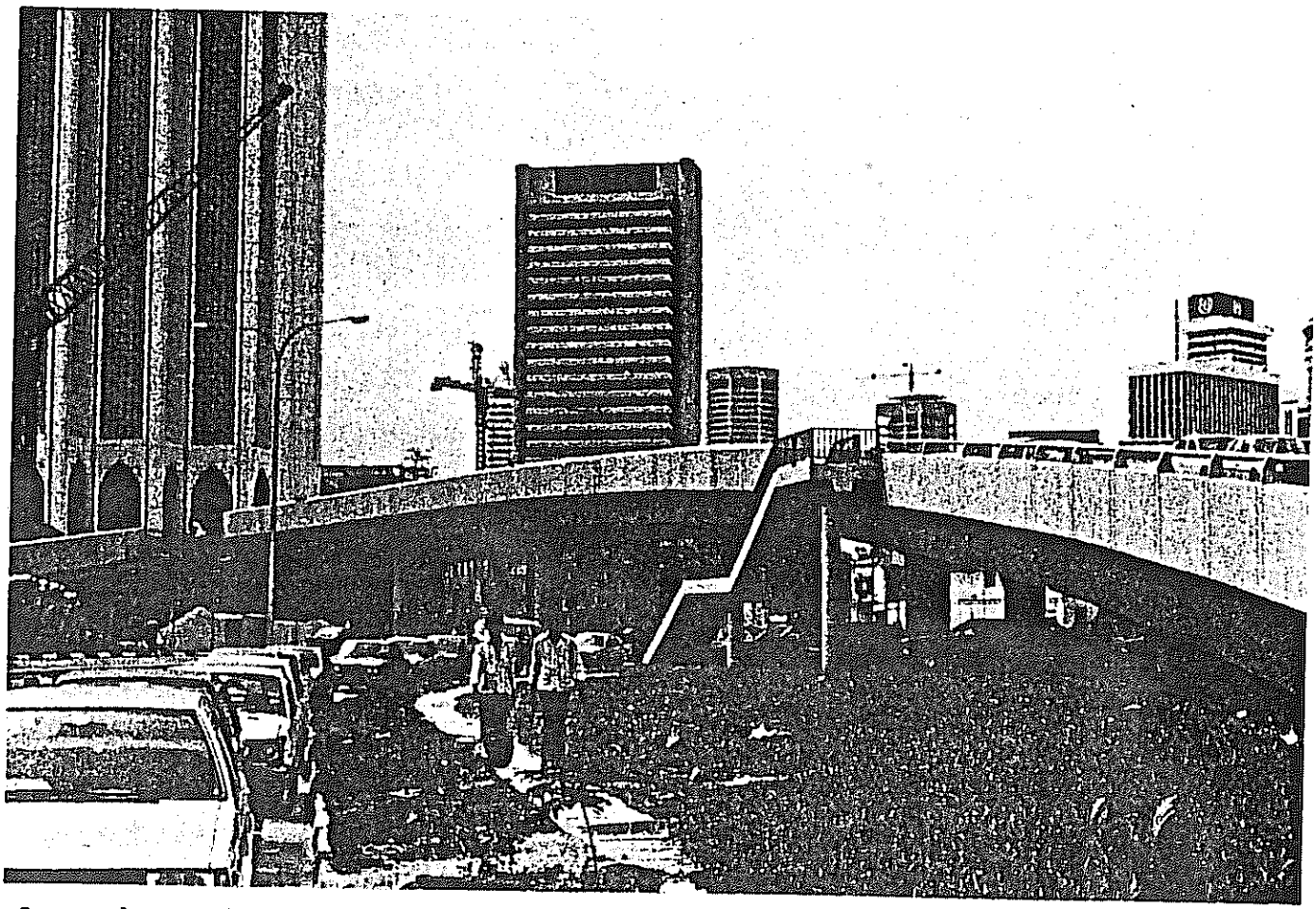
In the cities of the least developed countries like in India and Tanzania investment funds have been too limited to implement a high standard urban road network.
Here it is still possible to introduce solutions to the urban transport problem which are adjusted to the socio-economic conditions of the country.

World Bank experience and policy.

The World Bank has financed several urban transport projects in developing countries during the recent years.
Characteristic for the World Bank policy in this field is that it focuses on an improvement of the public bus transport service.



A Residential "highway" in Zanzibar Town.



An urban highway under construction in Kuala Lumpur.

The general aim of the projects is to improve public transport services in such a way that these services should be oriented towards meeting the transport needs of people from low-income areas.
To obtain a more efficient utilisation of the facilities and the existing bus fleet, the World Bank projects have adapted the following principles:

(i) removal of bus route bottlenecks in the congested city centres (by providing bus priority in junctions, separate bus lanes, restrictions for individual cars etc.),

(ii) upgrading and paving of bus route roads in the peripheral areas where the low-income groups live,

(iii) coordination of minibus operations with the conventional bus service,

(iv) reallocation of terminals and routes,

(v) improved organization of maintenance and operation management for the bus fleet.

Several projects have been carried out successfully by using these principles on public bus transport in cities with wide differences in topography, physical infrastructure, travel pattern, and administration, i.e. Abidjan, Nairobi, and Dar es Salaam.
No attention has yet been given to other modes of urban transport, e.g. bicycle transport, but the overall principles of the World Bank's formulation of projects could be adapted to other modes of transport as well.

Other aid agencies.

The Scandinavian aid agencies have traditionally emphasized rural development projects, e.g. rural access roads,

water supply and irrigation schemes, schools and health centres.
They are also engaged in interurban infrastructure projects within the fields of transport, communication and energy supply.
For example DANIDA (The Danish International Development Agency) and other aid agencies have planned to finance projects concerning interregional and interurban surface transport (trunk roads, railways, harbours) in the SADCC countries (SADCC = Southern African Development Coordination Conference).

SOCIO-ECONOMIC CONDITIONS AND THE CHOICE OF TECHNOLOGY.

How can urban transport projects be adjusted to the socio-economic reality of a developing country?
And how does the choice of urban transport technology affect the development?

In order to answer these questions the following main aspects have to be scrutinized.

Politically:

The development strategies, goals and objectives formulated by the governmental and political bodies should be considered. As mentioned previously the policy is seldom explicitly formulated but often given by the actual line of investments and priorities.
In either case it makes no sense to try persuading a reluctant government or institution to follow a strategy of low-cost or intermediate technology.
Should any development strategy be successfully carried out, the first precondition to be required is a positive political environment.

Culturally:

The development of technology should be adjusted to the cultural, social and religious traditions embodied in the urban population.
Any change of technology will have a cultural impact, either positive or negative depending on the point of view and political strategy.
But in any case the cultural constraints as well as the cultural impact from the project implementation should be assessed in advance.

Socially:

The accelerating growth of urban population, and the living conditions of the low-income dwellers - constituting the majority of this population - should be faced as a primary factor influencing the choice of technology.
There is a need to offer employment opportunities to the increasing masses of potentially productive but unemployed people.

Economically:

The economic resources - available to develop the physical infrastructure in urban areas - are extremely meagre.
Several developing countries have an average economic production (Gross Domestic Product) of less than approximately 200 US $ per capita (1980 - prices and level), e.g. Tanzania, Mozambique, India and Bangladesh.
As a comparison the equivalent figure applying for the Scandinavian countries is about 10,000 US $ per capita or 50 times higher.
In addition foreign exchange resources are very limited in the least developed countries.
To add to this problem import of fuel to run the motor vehicle fleet often consumes 40-60 per cent of the available foreign exchange.
Thus foreign aid in most cases accounts for a high share of the countries' development budgets.

Technologically:

The low technological level of the present urban infrastructures and production systems influences the starting point and speed of any technological development.
Both physical and institutional infrastructure is weak, and thus the transport system must rely on a high degree of self-organization both in the construction and operation phases.
Also the choice of transport technology should take into account the available labour force, i.e. both its amount, composition and skills. Unskilled labour is abundant whilst adequately educated and skilled labour force might be practically not available.

PRELIMINARY GUIDELINES FOR URBAN TRANSPORT PROJECTS.

The satisfaction of basic social needs as well as the stimulation of productive activities demand an improvement of the urban transport system. In the longer run such an improved socio-economic mobility could positively affect the development of import replacements and the transfer of innovations back to the rural sector.

As a point of departure a development project should aim at the following objectives:

(i) to minimize the total economic resource consumption, both in the implementation and operation stages,

(ii) to support a comprehensive solution of land use, physical transport infrastructure (roads, paths, other fixed facilities), and coordinated modes of transport,

(iii) to base upon the present level of urban productive forces, and to stimulate urban productive activities.

(iv) to minimize negative cultural and ecological side-effects.

Resource consumption.

Consumption of factors of production is required in order to produce/construct and operate a transport system. In this paper economic resource consumption is understood as the consumption of means of production, as it is directly affecting the economic development.
Consumption of labour is not considered as resource consumption due to the abundance of unskilled labour available in the developing countries. However, bottlenecks might occur for certain types of skilled and educated labour, and the transport sector might compete with other sectors in the demand for these specialized categories of labour. This might delay but not cause any long term constraints on the socio-economic development.
Furthermore, the delay will be minimized where the transport projects both in the implementation stage and the operation stage are designed to and adjusted to the present availability and skills of the urban labour force.

Resource consumption of a transport project includes construction and maintenance of fixed facilities, e.g. roads, paths, junctions, parking places, terminals etc., and production, operation and maintenance of the means of transport, i.e. the vehicle fleet and work shops.
Also included are alteration to existing buildings and plants, land consumption, and energy consumption.
In addition resource consuming side effects from motorized transport processes should be taken into account (e.g. traffic accidents, ecological damage).

Energy consumption:

The level of energy consumption when producing transport is of both economic and ecological importance.
The negative ecological effects increase progressively with the relative level of energy consumption.
Furthermore, the fossil fuel consumed by motor vehicles is a scarce and not regainable resource.

The following graph gives a rough picture of the level of energy consumption for different means of urban passenger transport.
The figures for bicycle transport and walk are estimated as the body-consumption of calories or kilojoule.
The figures for individual cars and buses assume an average utility rate.

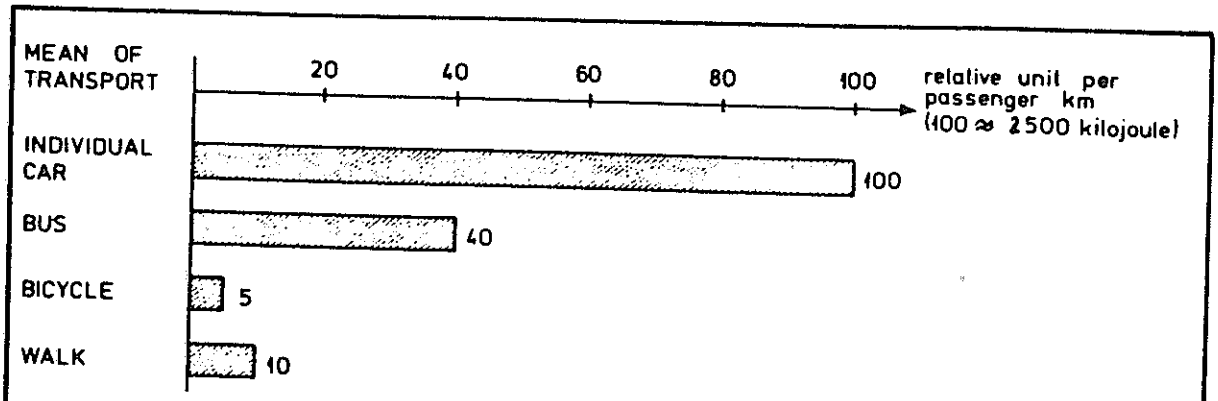


FIG. 3.1: COMPARATIVE FIGURES OF ENERGY CONSUMPTION.

The physical planning approach.

Land use planning:

In order to prevent or reduce negative effects from excessive functional separation the following principles could be applied to a larger extent:

- daily urban activities should be placed within short distances from residential areas (to be reached by walk and bicycle),

- urban functions located in long distances from residential areas (large workplaces, specialized functions) should be reached by public bus transport,

- within urban planning areas (districts) should be strived towards a higher degree of geographical balance between residents (employees) and workplaces.

Transport planning:

Still it happens that traffic planning approaches of industrialized countries are uncritically transferred to cities of developing countries.

This implies that:

- mainly the motor vehicle traffic is considered hence excluding any alternative modes of transport which might provide a low-cost solution adjusted to the economic capability of the urban low-income groups,

- mainly the traffic sector view is considered leaving out alternative land use solutions and environmental viewpoints which might be able to reduce resource consumption in the long run,

- unrealisticly high growth rates of the individual car densities are assumed.

Hence large funds are tied up for the purpose to construct and maintain an expensive road network, the provided transport system does not meet the basic needs of the majority of the urban population, and it does not stimulate the socio-economic activities at the present level of urban productive forces.

Adjustment to the present productive forces.

In contrast to this the transport planning approach has to consider the present and future socio-economic conditions of the urban sector in developing countries, i.e.

- the urban population is growing by alarming rates,
- the economy is stagnant or even declining, and resources available to establish and maintain the urban infrastructure are extremely limited.

More specifically these two factors imply that:

- the existing transport system (road network, vehicle fleet) is deteriorating very quickly,
- the private/individual car density is exceptionally low compared to industrialized capitalist countries, and private car transport is nearly negligible among the urban masses,
- the main part of daily trips is produced by walk, whilst bicycle transport and bus transport play a modest role,
- the average trip length is growing fast due to the physical expansion of the urban areas.

The informal sector as a potential development factor.

The rapid urbanization is combined with the extremely meagre economic resources, lack of public service facilities, and lack of employment opportunities in the formal infrastructure- and production sector.
There is an unused potential capacity in the huge number of unemployed urban dwellers.

Hence self-organization and informal economic activities develop spontaneously within the urban sector.

Production and markets:

Petty trade and illegal markets develop, and also small repair workshops for bicycles and cars, wood workshops etc. emerge.
Concerning production of simple spare parts and repair workshops both skills and capacity are available for further expansion of economic activities.

Housing:

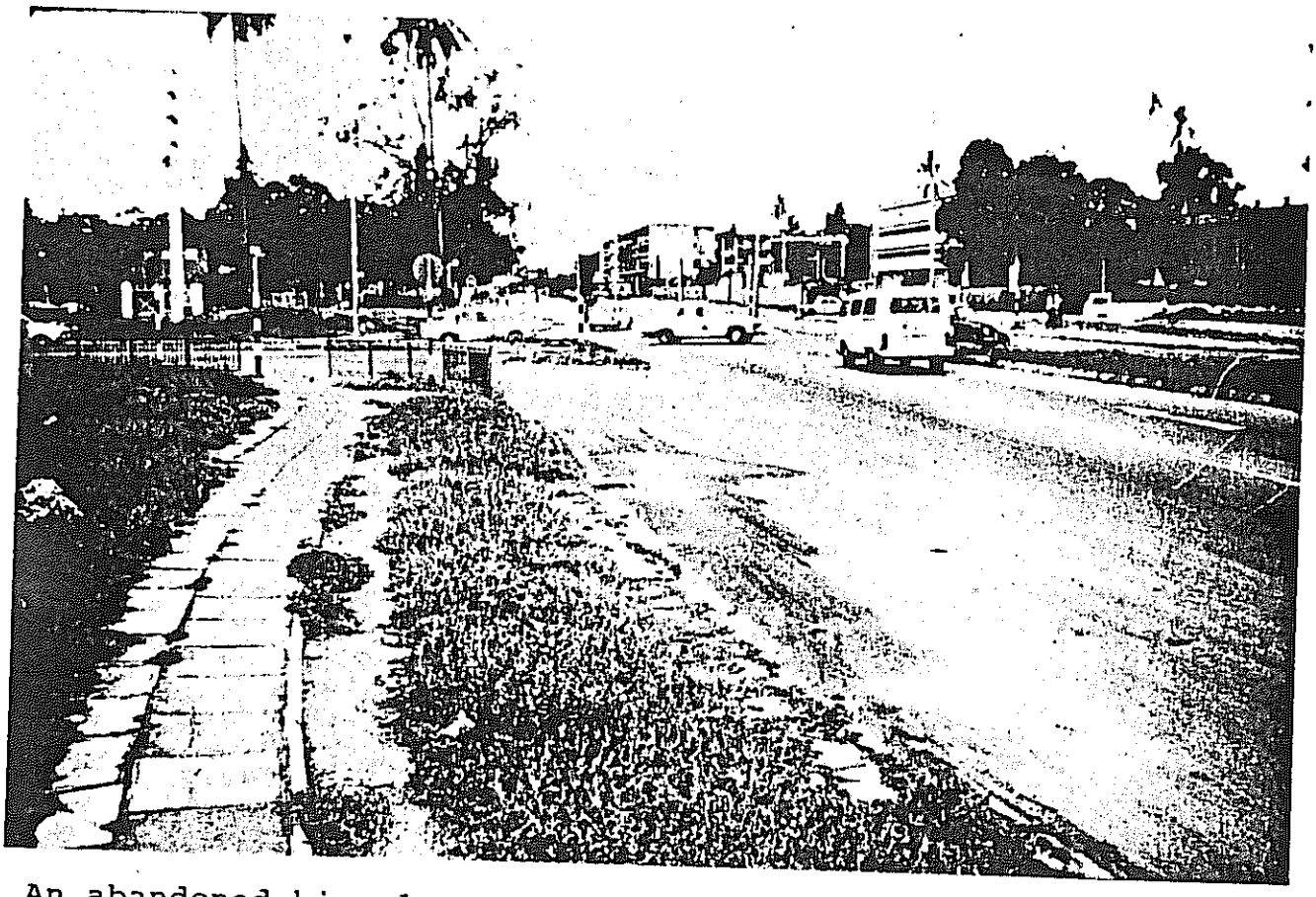
Within the housing sector large, unplanned squatter areas shoot up and expand rapidly.
The largest part of the housing construction already takes place individually both in the squatter areas and in planned areas with surveyed plots or within sites and services schemes.
Housing schemes financed by government or public/private organizations contribute to a decreasing share of the urban residential development.

Transport:

The local and national governments of the least developed countries have no possibilities of financing expensive solutions to the urban infrastructure development.
And the aid agencies are not yet fully aware that it is possible to rely on a higher degree of self-help organization, e.g. the development of bicycle transport, rickshaw transport and intermediate transport means within the transport sector.

Concerning the physical infrastructure there are further points to be considered.

The existing road networks are often physically designed for motor vehicle traffic and therefore also adequate to cater for extended bus- and minibus services.
Whilst a significant increase of bicycle traffic and bicycle drawn rickshaw traffic would need the introduction of different design criteria and a regulation of the motor vehicle traffic.



An abandoned bicycle track along a major traffic road in Dar es Salaam.

In the extreme situation where nearly no motor vehicle traffic occur, for example in some areas of Chinese and Indian cities, only minor amendments of the existing road network would be necessary except from major bus routes.
But safety problems occur along roads where the motor vehicle traffic is considerable, especially if there is a

relatively high number of heavy vehicles combined with a high speed level.
In these cases bicycle transport becomes difficult and dangerous, unless a physical separation of the bicyclists from the motor vehicles is introduced.

ASSESSMENT OF TRANSPORT TECHNOLOGY.

A paradigm of main aspects.

In order to facilitate a comprehensive assessment of alternative technologies the following main aspects could be considered:

(1) Functional/productive impact, i.e. technological appropriateness concerning technique, organization, knowledge and labour.

(2) Requirements to the physical and institutional infrastructure.

The aspects (1) and (2) specifically relate to the total productive capability of the society, i.e. requirements to and impact on the productive forces.

(3) Impact in relation to the nature or geophysical environment, specifically in terms of resource consumption and ecological changes.

(4) Social impact , specifically effects in relation to location, employment, income distribution, and cultural traditions.

The following figure tries to provide a very simplified illustration of these comprehensive relations mentioned above.

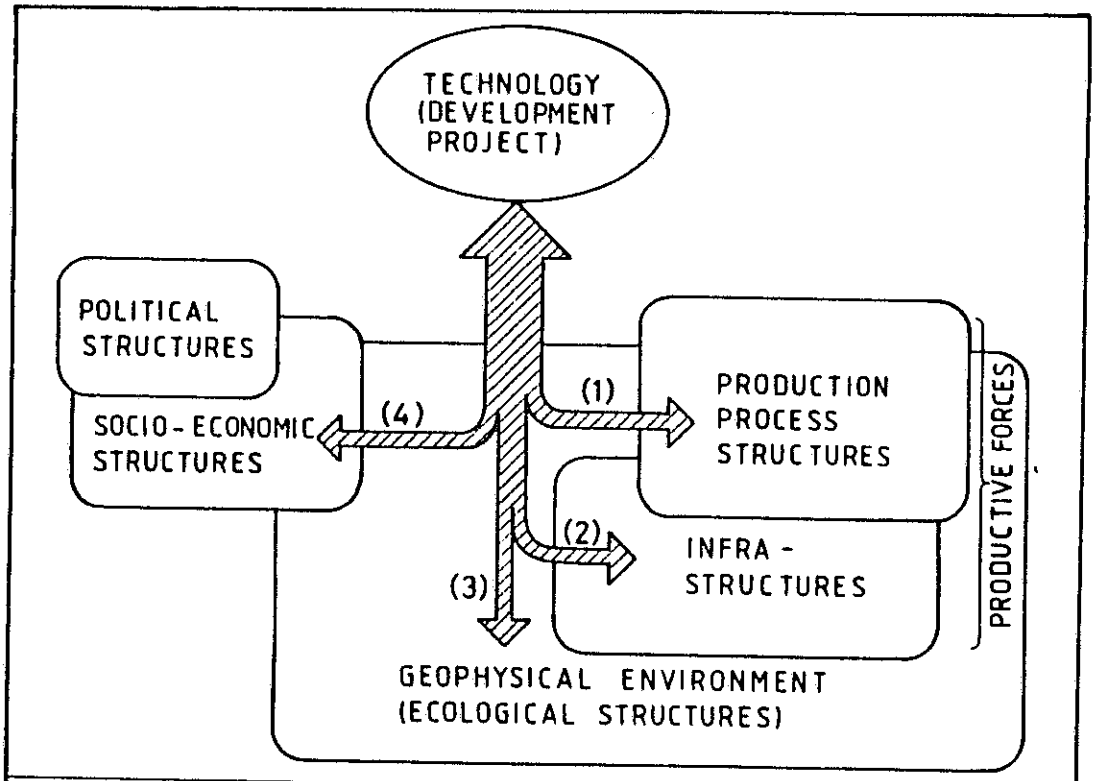


FIG. 3.2: A PARADIGM OF SOCIETAL STRUCTURES AND RELATIONS

Categories of effects.

Impact studies on transport development projects might refer to the following main categories of effects:

- socio-economic development effects
- direct resource-consuming effects
- side effects.

The socio-economic development effects include:

- Geographical and social distribution of the transport services which more specifically affect and change the accessibility, social and economic mobility.

- Geographical and social distribution of employment and income.

The direct_resource-consuming_effects are:

- Means of production - others than land and energy - consumed by the production and operation of the transport system.
- Land consumption, i.e. land use occupied by the transport facilities.
- Energy consumption.

The side_effects of a transport project include:

- Economic effects like consumption of foreign exchange, and traffic accidents.
- Social effects like traffic accidents, and physical barrier effects.
- Ecological effects like traffic noise, air pollution, water- and soil-pollution, as well as consumption of non-regainable resources.

If scrutinized in more detail the side effects could well show up to represent the bulk of long term impact on society and nature.

Economic characteristics of various modes.

Walk:

Within short distances, i.e. 1-2 km trip lengths, walk is the most flexible and economical mode of passenger transport.
There is extremely little resource consumption related to walking. And the requirements to the physical infrastructure are very modest, as long as other transport systems or topographical conditions impose no physical barriers on the pedestrian routes.

However, walk becomes tiresome and timeconsuming for trip length above 2-3 km, i.e. 20-30 minutes walking time. And as the urban areas expand the need for other transport modes increases drastically.

Passenger cars:

The economic conditions, the least developed countries are facing, make it clear that only a very tiny fraction of the urban population will be served by individual cars in a foreseeable future.
Socially, only a small minority can afford to purchase or have access to a car.
Economically, individual car transport is an extremely expensive solution to the urban transport problem.

Public buses:

Public bus transport is a necessity in cities and larger towns today and in the future.
However, bus transport can only offer regular transport services along the major traffic routes. And it will be too expensive to extend public transport in order to provide door to door transport, although informal public transport systems like minibuses and rickshaws can offer this service until a certain extent.
Besides, though bus transport is a cheaper solution than individual cars, it still requires a considerable consumption of foreign exchange to import the buses, spare parts and fuel.

Bicycles:

The running costs of bicycles are very low. They are easy to repair, and they consume no fuel.
Maintenance and repair of the bicycle fleet do not require any initial investments in expensive workshops.

And the consumption of foreign exchange for import of bicycles and spares is limited (the amount of money needed to import one saloon car is equivalent to approx. 100 bicycles).

Comparative impact.

IMPACT	CAR	BUS	BICYCLE
Consumption of foreign exchange	high	medium	low
Demand for skilled labour	high	high	low
Level of management and organization	medium	high	low
Requirements to the physical infrastructure	heavy	medium	light
Ecological side effects	significant	modest	negligible
Contribution to social mobility	low	medium	high
Impact on location structure	urban sprawl	heavy	light
Income distribution	high income priority	low income priority	low income priority

PROMOTION OF LOW-COST TECHNOLOGY.

The feasibility of bicycle transport.

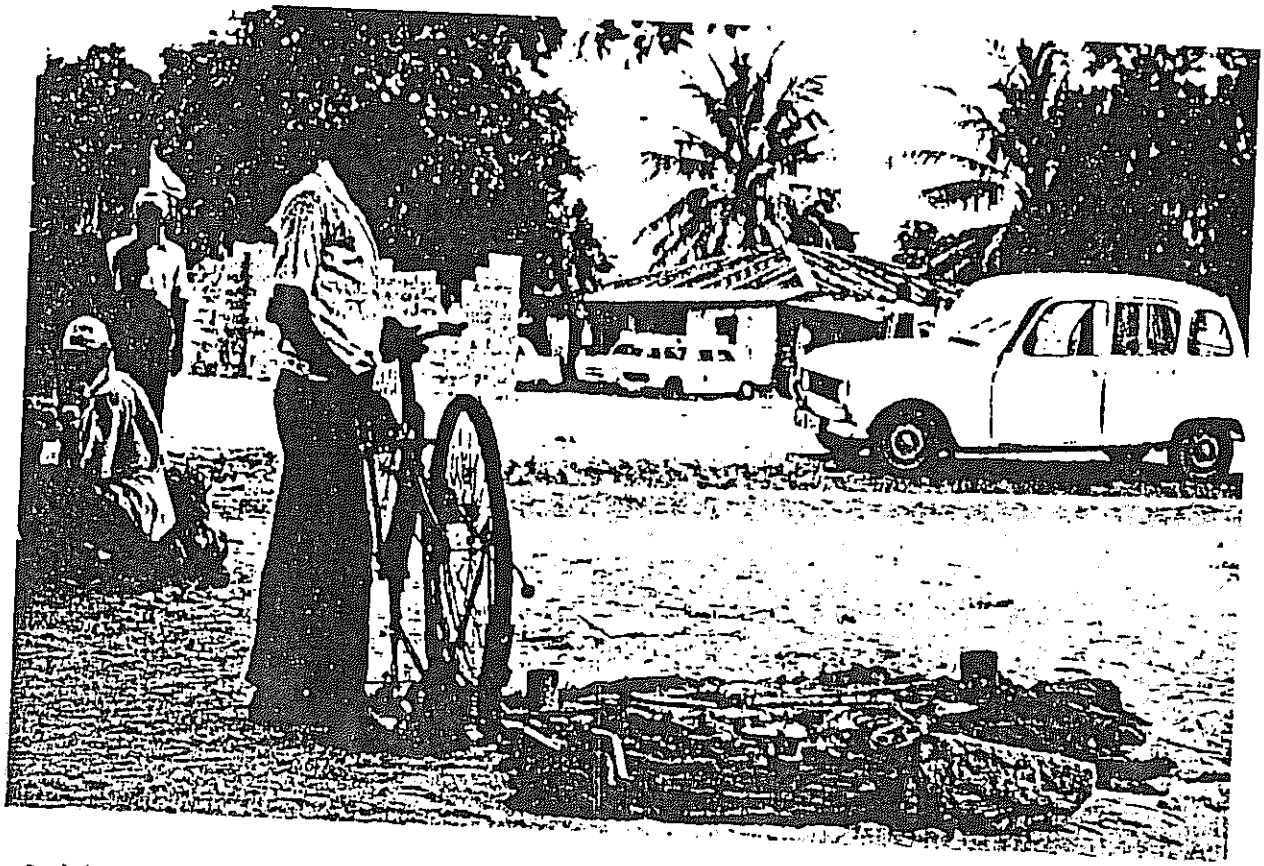
Bicycle transport is selected here to illustrate how intermediate low-cost technology can be introduced into the urban transport sector.
As it is seen from the preceding description the mode of bicycle transport might be able to offer several development advantages compared to individual car transport and, even to public bus transport.
The step from a pedestrian to a bicyclist indicates an increase of the mobility and transport efficiency by several hundred percent.
This step can be compared to the change of earthwork in a construction process from a technique, where the material is handpicked and transported in small headbaskets, to a technique using shovels and wheelbarrows.
The bicycle is flexible as it can be used both as a mean of individual and collective passenger transport (e.g. bicycle-drawn rickshaws), as well as a mean of goods transport (e.g. bicycle-drawn trailers).

Bicycle transport meets the previously formulated objectives to a large extent:

- The economic resource consumption is minimized as bicycle transport is a low-cost solution to the urban transport problems. The requirements to physical infrastructure are light, and besides the solution implies little consumption of foreign exchange. It will meet the demand for transport where the walk distance is too long, and thus be able to save or reduce expensive expansion programmes for the public transport system.
- A comprehensive urban masterplan solution can be supported as the bicycle mode is easy to adjust to alternative land use structures and to coordinate with other modes of passengers transport.

- Productive activities can possibly be stimulated at a large scale as bicycle transport specifically aims at an increased mobility for the low-income commuters which constitute a majority of the productive urban population. The bicycle is not attractive to more privileged groups.

- The present level of productive forces is considered. The repair of bicycles can be made individually by local people, and assembling and production of spares could take place in existing small workshops without any need for advanced equipment.



A bicycle repair "workshop" in Dar es Salaam.

The barriers.

Several aid agencies operate according to the goal of stimulating a technological development which meets the needs of the low-income groups.

The Scandinavian aid agencies are even guided by the politically formulated objective of supporting "the poorest people in the poorest countries", i.e. the low-income people in the least developed countries.
However, there are several barriers to break through, before such a principle can be transferred into practical development policy within the transport sector:

The policy barriers.

Up till now investment projects in the urban transport sector have emphasized the development of a major road network for car traffic and a more efficient public bus service.
Neither the national governments nor the multilateral and bilateral aid agencies have yet been involved in projects aiming at more comprehensive solutions to the transport problems in urban areas of developing countries.
Especially the possibility of developing bicycle transport, and thus exploit the potential capabilities of the so-called informal sector, has so far been neglected both in the urban master planning and in the investment policy.

The cultural barriers.

Social, cultural and religious traditions influence the peoples choice of transport mode. In some countries female bicyclists are very rare. Practical reasons also play a role as most of the bicycle models are not designed for womens dress.

The inadequate physical infrastructure.

Traffic safety is often extremely low from the bicyclists point of view. This situation is mainly due to inadequately designed bicycle routes, but it is accentuated by a relatively high level of car traffic in the central urban areas and along the major traffic roads.
Also the physical condition of the routes is poor both due to lack of maintenance and lack of facilities for bicycle traffic in general.

The limited supply of vehicles and spare parts.

As mentioned previously, for some developing countries up to 40-60 percent of the foreign exchange revenue is consumed by the import of fuel.
An additional amount is used for import of vechicles and spare parts in order to maintain the capacity of the existing motor vehicle fleet.
Furthermore, a considerable share of the public budget is tied up in order to maintain the existing urban road network, motor vehicle workshops and service stations.
At the same time the supply of bicycles is often insufficient as well as it might be difficult to purchase essential spare parts like tyres, tubes and chains.

The lack of product development.

Most existing bicycle factories in developing countries are assembly plants, with the majority of components imported from the parent countries.
Hence, the conventional bicycle models available at the market are designed to suite large-scale manufacturing using highly mechanised production methods and advanced equipment.
The future design of the bicycle should to a higher degree consider:

- multi-purpose requirements, e.g. womens clothes, load carrying possibilities, attachment of trailers/rick-shaws etc.,
- robustness and longivity, due to poor routes and maintenance conditions,
- suitability for small-scale assembling and production of spare parts.

Pilot projects.

Marketing campaigns might convince the political, administrative and planning bodies, and even contribute to a change of peoples attitudes in favour of more frequent use of bicycles.
The supply situation could be improved by providing more favourable conditions for the import of bicycles and bicycle spares at reasonable prices, and by supporting the development of small-scale assembly and production workshops.
The provision of better and safer bicycle routes implies more emphasis on both the planning, design, construction and maintaince of these physical infrastructure facilities.

Succesfully implemented pilot projects would positively affect all these processes. A pilot project could include both the psysical improvement of routes and the improvement of vehicle supply, as well as it could be coordinated with ongoin campaigns for bicycle transport.
The promotion of bicycle transport in urban areas of the least developed countries is an adequate field of pilot projects mainly due to the following reasons:

- The projects can be kept within limited total amounts of costs, e.g. construction of tracks along existing roads and a coordinated supply of vehicles to adjacent workplaces and institutions.

- The projects can be implemented and evaluated within a few years.
- The projects will stimulate other economic activities within the urban area, as the total project costs include a high share of wages and a low share of import compared to other transport projects.

Eventually, the pilot projects could be able to demonstrate bicycle transport or bicycle-based transport (i.e. trailers, rickshaws) as an efficient low-cost solution to the increasing transport needs of the growing urban population and economy.
In the longer term also a bicycle product development should be initiated by the aid agencies (i.e. UNIDO) in cooperation with the national and local authorities.

REFERENCES

(1) Kristiansen, J.: Samfundsøkonomi, grundlæggende begreber ["social economy, basic concepts"].
(Unpublished notes, Aalborg University 1976)

(2) Müller, J.: Liquidation or Consolidation of Indigenous Technology.
(Development Research Series, Aalborg University Press 1980)

(3) Kristiansen, J.: Economics of urban land use pattern and transport (unpublished notes, Ardhi Institute, Dar es Salaam 1981)

(4) Jacobs, Jane: The Economy of Cities, 5. Explosive City Growth (Penguin Books, 1972)

(5) Kristiansen, J.: Regional transport (Ardhi Institute, Dar es Salaam 1983)

(6) Bardsley, M. N. and Jacobs, G. D.: Road accidents as a cause of death in developing countries (TRRL report SR No. 277, Transport and Road Research Laboratory, England 1977)

(7) Gunnarsson, O. and Korner, J.: Trafikplanering ["Traffic planning"] (Scandinavian University Books Stockholm 1975)

(8) Automobil-importørernes Sammenslutning: Vejtransporten i tal og tekst ["Road transport statistics"] (Copenhagen 1984)

(9) Cowiconsult AS: Dar es Salaam Urban Passenger Transport Study - final Report (National Transport Corporation, Tanzania 1983)

(10) Overgaard, K. R.: Planlægning af kollektiv trafik i den tredie verdens storbyer ["Public transport planning in Third World Cities"]
(Article in: Kollektiv trafik i byer, forstæder og landdistrikter, Teknisk Forlag, Copenhagen 1977)

(11) Barwell, I. J. and Howe, J. D. G. F.: Appropriate Transport Facilities for the Rural Sector in Developing Countries (ILO World Employment Programme, Geneva 1979)

(12) Halla F.: Bicycle transportation in Dar es Salaam City
(A diploma project, Ardhi Institute, Dar es Salaam 1981)

(13) Midgley, P. and Watson, P. L.: World Bank experience with urban transport projects, with particular reference to Latin America and Africa.
(PTRC Proceedings No. P 207, Transport planning in developing countries, London 1981)

(14) Gullestrup, H.: The Ecol-Humanistic Technology - the new technology as experience from the past (Development Research Group , Working Paper No. 2, Aalborg University 1983)

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